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CHICAGO, JUNE, 1914.

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INDEPENDENT PROSPERITY.

WE emphasize *independent* prosperity in the title of this note because the prosperity of a large number of small units is always, or at least *seems* always, to be more significant and more convincing than the prosperity of a single large unit. When the independents prosper we feel that the whole telephone industry prospers.

Now there is considerable talk at the cross-roads store these evenings about bad business, and even the threat of hard times. Purveyors of luxuries are complaining that the people are indifferent. Even some of the sterner necessities are said to be moving but slowly—though it is whispered that the hesitation in their case may not be wholly due to a sluggish public purse.

But the telephone evidently is neither a luxury nor one of those necessities which are actuated by mysterious motives of political or strategic origin. Its progress is straightforward and without guile, as becomes a utility necessary in equal measure to the humble and the great.

So we need not be surprised to find the telephone prospering regardless of trouble and rumors of trouble. Our digest of the A. T. & T. annual report in April showed how the Bell branch of the business is growing. But the independent branch, being made up of a large number of comparatively small units, has no single, comprehensive report available as a record of present and future prosperity.

That being the case, we have made it a point to look into the condition of independent telephony from the operator's side. The investigation has not progressed far enough to warrant a treatise on the subject this month; but so far as it has gone, it has cheered and encouraged us greatly. For we have not only knowledge but proof that the independent operating companies are prospering.

Given good service and reasonable rates, an operating telephone company's prosperity is thrust upon it. Progress and growth become then merely a question of financing new construction. But of course a company suffering from indecision or indifference or a general case of "cold feet" can let its waiting list wait, or it can give such careless service that it has no waiting list. Then, where there is competition, the opposition gains; where there is no competition, the demand for service remains latent, ready to become dynamic as soon as the supply is evident.

A good many people have been obsessed by the notion that the independent operating companies of the country had slowed down until they were hardly moving. This view of the independents as a whole, of course, never had any justification in fact. That *some* independent operators showed marked symptoms of hesita-

tion for a time cannot be denied; but their lack of enthusiasm cannot be laid at the door of the administration or blamed on the difficulty with Mexico. Briefly, if somewhat vaguely, they were waiting for something to happen. They did not know what it would be; but intuition told them a change was coming.

We have already commented on the psychological effect of the Bell-independent contract negotiations of the last five months. So far, there has been no actual physical or economic change that would produce better business for the independents; but the result is as great as though there had been one. All along the independent line there is a definite movement forward—a quickening of interest and a spurring of ambition.

All this is probably of little moment to the many independents who have never felt the burden of uncertainty and have always been industrious and progressive—except that they are glad to see independence in general once more a "movement" instead of a name. But they, too, have doubtless suffered for the desuetude of their confreres in more ways than one. For their enemies have not been slow to take advantage of the condition and even exaggerate it to the point of proclaiming independent telephony dead.

For that reason, and the effect on the service-using and security-buying public, we believe every independent operator who contemplates making any increases, building new exchanges or new lines, should make the fact known as widely as possible. Commercial axioms like "business begets business" and "nothing succeeds like success" are absolutely true. But business begets more business only when the world plays godfather; success only succeeds in the fullest degree when the world recognizes it for success. Progress, new construction, shows prosperity. Let all the world see it, and it will bring more prosperity.

It is necessary for the good of the companies concerned, for the good of the independent cause, for the good of the whole telephone business, that the facts about independent prosperity be made known. We hope to assist in making some of them known.

"WE DID IT!"

BURIED at the end of the section on "Engineering" of the last annual report of the American Telephone and Telegraph Company, is this significant paragraph:

> It can be said that this company has created the entire art of telephony and that almost without exception none of the important contributions to the art have been made by any government telephone administration or by any other telephone company either in this country or abroad.

Considered purely as an argument against government ownership this statement may be serviceable. As a record of fact, however, the only thing that saves it from the charge of hyperbole is a mere technicality—the words, "It can be said."

Being a part of the engineering section of the report, it is evident that "important contributions to the art" refers wholly to technical or engineering progress, and not to economic development. It may not be entirely relevant, therefore, to point out that the independent companies, and not the Bell, deserve credit for initiating the aggressive campaign that has made this the best telephoned country in the world. It was the independents who first conceived the idea of a telephone for every family, and who first undertook to make every farm house a telephone station. But the paragraph claims only engineering monopoly for the Bell.

Probably the most important engineering development which the Bell engineers have had no hand in, at least in putting it into service, is the automatic telephone. Whatever may be the arguments for or against its adoption, there is no longer any doubt whatever of the success of the automatic as a substitute for the manual switchboard. Nor is there any question that the development of the automatic system has demanded engineering brains of the very highest order. Almost as much may be said of the semi-automatic system; for whatever may have been done behind locked laboratory doors, all of the various types of semi-automatic equipment bear independent names.

To the value and importance of the automatic and semi-automatic types of apparatus the Bell interests themselves have given testimony by spending hundreds of thousands of dollars to acquire shop and patent rights; licenses which, so far as the public knows, have never been used.

Now so far as the public is concerned, of course, patent rights do not exist. The layman regards the automatic as merely a type of telephone, to be made in any shop by the readjustment of a machine or two. So the Bell representatives are often asked: "Why don't you give us automatic telephones?" And evidently these same Bell representatives have not been instructed as to a form of answer to this question. For sometimes they say the automatic is not successful, even though it appear so; and sometimes they actually promise automatic equipment "when the traffic has reached a certain point." But they never install it. The most obvious explanation would be that one successful installation of automatic equipment by an organization like the Bell company would be very apt to mean demand from all over the country. Of course, to gratify such demand would mean an extraordinary charge to the account of obsolescence. At any rate, we know that the automatic is wonderfully successful where it is installed, and that it is an independent development. We may, indeed, be pardoned for expressing our own opinion that it is the greatest of all "contributions to the art" of telephone operating.

Numerically these really important contributions have not been many since the perfection of the existing form of transmitter and receiver. Credit for the common battery system must go, of course, to the Bell engineers. The Pupin coil, a really great invention, which has made long distance practicable, is Bell property, to be sure. But it became so by acquisition. Professor Pupin was not a Bell engineer.

We have not the slightest desire to belittle the wonderful work of the remarkable organization of engineers in the employ of the Bell companies. But neither can we permit the utter ignoring of the splendid engineering talent which has devoted its efforts to the perfection of independent equipment.

The development of telephone apparatus has been largely a matter of improvements in detail added to simple fundamentals. In making those improvements no one can deny that the independent engineers have been pre-eminent.

The paragraph from the Bell report which we quoted at the beginning of this editorial is not illogical in the letter; but in the spirit it provokes criticism and denial.

THE TELEPHONE AND THE MOVIES.

THE movies have become the favorite entertainment of the people because they depict life. Their out-door scenes are really out of doors; their interiors are closer

copies of real homes or offices than can usually be arranged on a stage.

In the dramatic reproduction of social and business episodes the telephone frequently plays an important part. So it is not at all unusual to find that instrument an important "property," perhaps used several times in the course of a single reel of pictures.

But the property man in a moving picture studio must keep in stock a thousand and one articles—or more nearly ten thousand and one. He would be guilty of little exaggeration if, when asked to list his material, he wrote the one word, "Everything." So, perhaps it is hard to blame him for confining his telephone equipment to a single common-battery desk set. As a result, when the miner in a western prairie shack calls up the sheriff to tell him the outlaw has just ridden past, he uses a modern common-battery desk outfit. The movie farmers, of course, all enjoy the same sort of service.

It is noticeable, too, that the telephone appears in a movie household only when it is used in the plot of the story. The producer of the picture has learned by this time that all offices have telephones, and so we find the ubiquitous desk set in evidence on any office desk or table that happens to be serving the hero or villain. But in the home scene, however luxurious or squalid the furnishings, there is no telephone, desk or otherwise, unless the plot calls for it.

And when the plot *does* call for it—what wonderful service the movie actor is able to call forth! He lifts the receiver and presto! he is talking to the right number. A few frantic lip movements and he hangs up. The operator, not having any part in the play, is quite obviously omitted from the action, thereby saving several feet of film.

Far be it from us to add to the already torturous burdens of the motion picture producer and his property man. Besides, no doubt other tehnically precise industries besides that of the telephone might find opportunity to take a fall out of the pride of the popular movie man if they so desired. But at least let us tease him to add one magneto wall set to his props, to use the desk set he already has in a few more promiscuous scenes, and to give the operator a chance to answer the impatient hero.

COME OUT, McGUIRE!

IN A small country town there used to live an old Irishman of whom it was said he was always looking for a fight though never drawn into one. The sports of the community on one occasion egged on a young man of pugilistic tendencies until he challenged McGuire to a prize fight, and McGuire told him that if he would come to his house at twelve o'clock that night and call him out, he would fight him.

The young fellow went to McGuire's house as planned, followed at a distance by his backers. He called, "Come out, McGuire!" He repeated the call again and again, but McGuire did not come out, so the party went away. The next morning when McGuire appeared on the street he was taunted with being a coward, but with the ready wit of an Irishman he responded: "Sure, an' the young mon came up and called 'Come out, McGuire! Come out, McGuire!' but he should have said, 'McGuire, come out!' There's a dale of ithics about this prize fightin' business and the rules musht be obsarved."

Just so, any man who is looking for ways in which to escape his responsibilities and to evade his duties can find them. There will always be a technicality by which we can escape if we are anxious to do so.

The plainest duties that are set before a man are not those which are laid down in some iron-clad contract to which he has affixed his signature. The most important duties of life are not those we cannot escape by hook or crook.

The man who is to make good is not the one who is all the time looking for a way to get out of doing what it is put up to him to do. It is the man who shoulders his responsibilities and assumes his duties wherever he finds them and who looks for the way in which to do to the best advantage the thing he has to do.

If one is looking for the easiest way to slip along through life, one may usually be found, but it will not be the way that leads to success, fame, glory, power, or to any other good thing. The slip-along way is no way for the man with red blood in his veins. It is merely a makeshift way for the man who doesn't care.

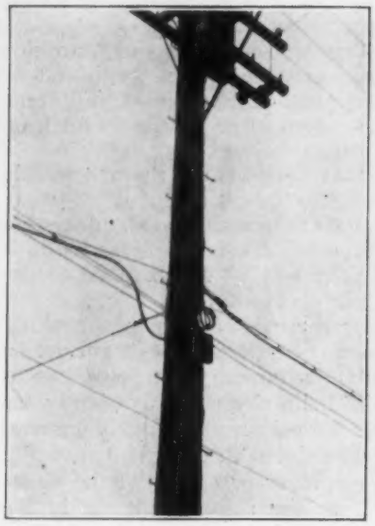
Whether a man is employer or employed the situation is the same. Whether the responsibility is in the form of an order from a superior or in the form of an obvious duty, it should be met squarely. To meet the responsibility, perform the task and leave the accomplished work with one's imprint of character upon it, is the mark of the man who is irresistibly on his way to success. To side step, to make excuse, to say, "I wasn't hired to do that," "I didn't understand it that way," "I didn't think it absolutely necessary," is to write failure across one's pathway to stumble over in the future.

When responsibility calls, "Come out, McGuire!" instead of hanging back and chuckling because we will be able to excuse ourselves for not coming out by saying, even if truly, that the call should have been reversed or changed this way or that, let us get out and do what is expected of us. When we have agreed to fight, let us fight tooth and nail to a finish!

There is no trouble about misunderstanding an order or the necessity for an apparent duty if we go to looking for the opportunity, but what are we here for; to make something of our lives, or merely to drift along the easy way, waiting for it to come time to die?

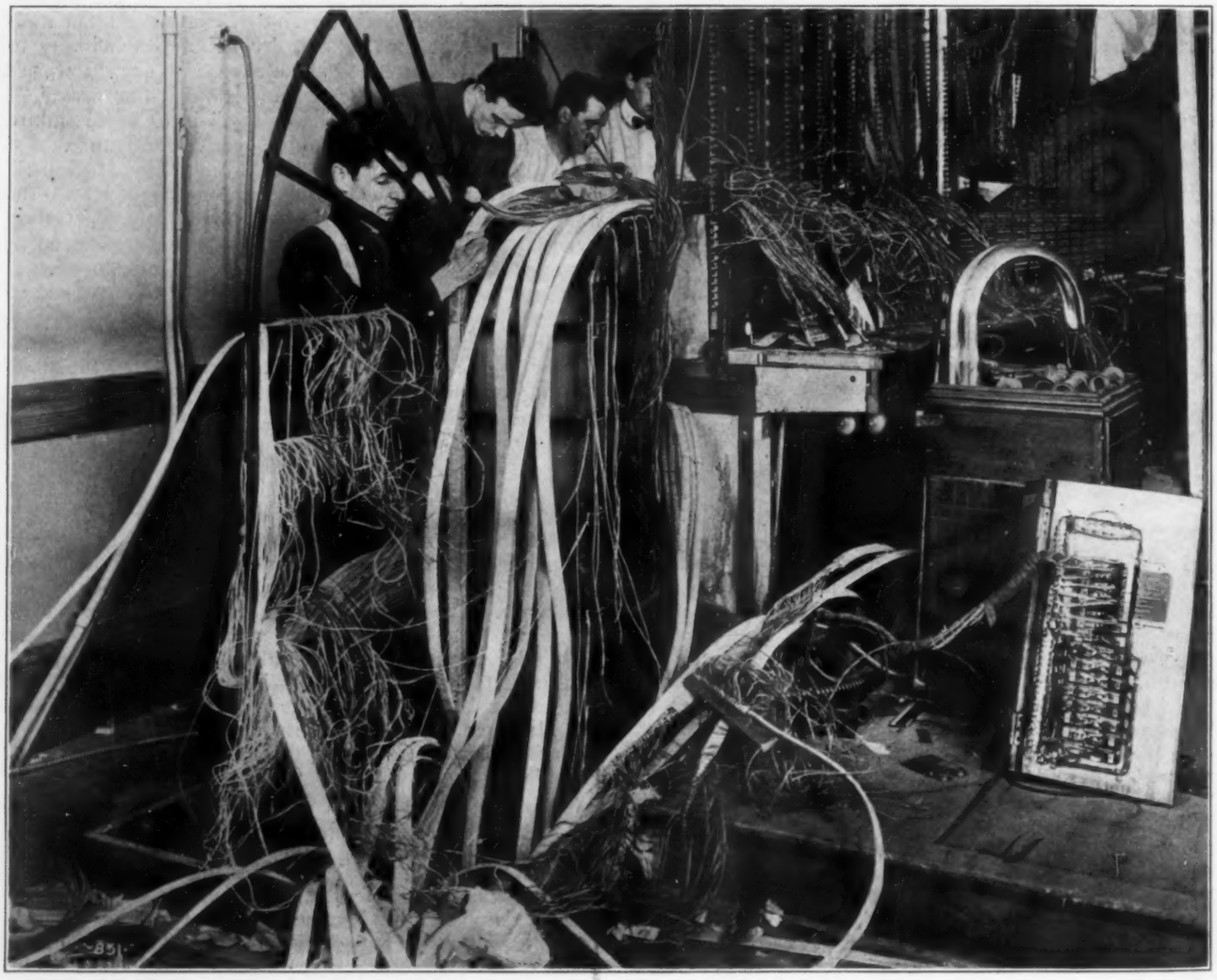
ANOTHER ELECTRICAL SHOW FOR CHICAGO

Notwithstanding the fact that Chicago's seventh annual Electrical Show is still more than four months in the distance, there is a gratifying preliminary demand for space. The directors decided to make an early campaign owing to the intervening summer months, with the idea of getting contracts rounded up before the outing season gets here. The show is set for October 31 to November 14, and among the contracts already secured by Manager Homer E. Niesz are those signed by the General Electric Company, the Westinghouse Company, Simplex Electric Heating Company, National Electric Lamp Association, Pelouze Manufacturing Company, Federal Sign System, Electric Storage Battery Company, Commonwealth Edison Company, Electrical Testing Laboratories, Hughes Electric Heating Company, American Telephone and Telegraph Company, Chicago Telephone Company, Ft. Wayne Electrical Works, Birtman Electric Company, and others. Many of these concerns have taken more space than they used in the last show. The offices of the Electrical Show are in the new Edison Building, 72 West Adams street, where diagrams of the floor space and other information may be secured.



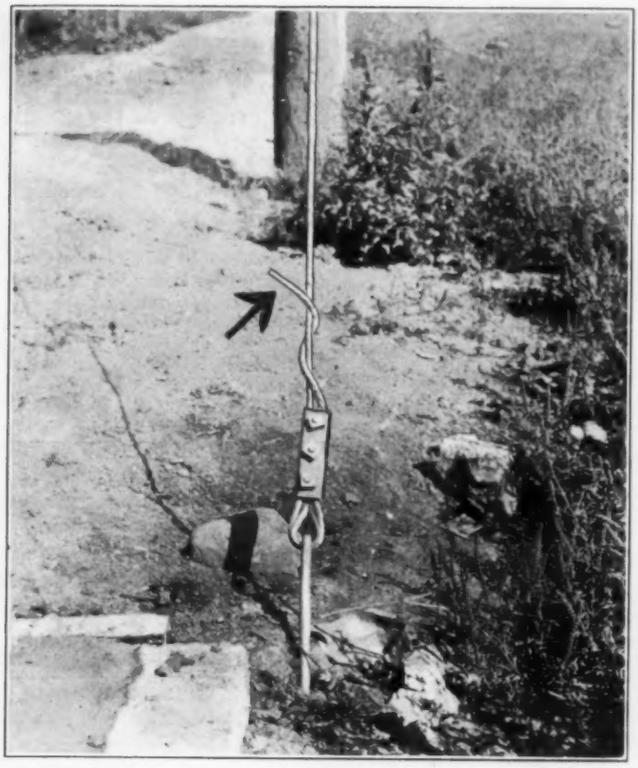
Waste of Cable Shown in Unnecessary Loops at Left of Box.

Wasteful Method of Bringing Cables Into Manhole. Absence of Orderly Arrangement, Open Ducts and General Bad Condition.



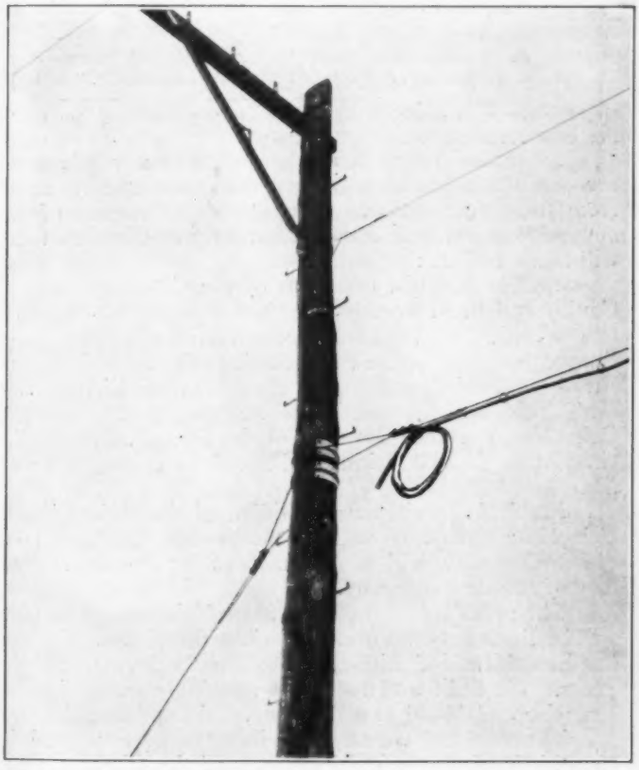
Scene in the New England Telephone & Telegraph Company's Worcester, Mass., Central Office During Restoration of Service After the Fire of March 28. The End of the Park Switchboard, Showing How Closely Men Worked in Twelve-Hour Shifts and the Infinite Detail.

STORIES IN PICTURES OF TELEPHONE PRACTICE AND PROGRESS IN ALL PARTS OF THE WORLD.

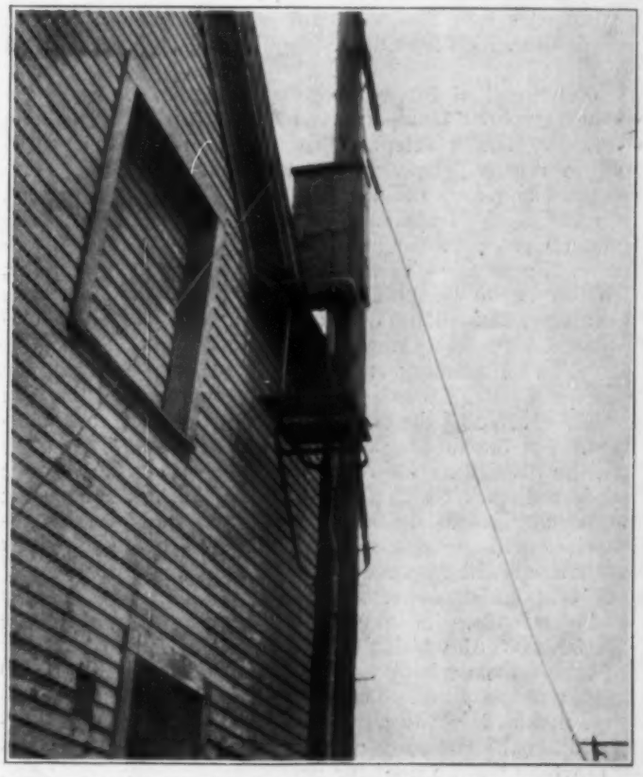


End of Anchor Guy Left Too Long. This Is Not Only Wasteful, but There Is Danger That the Public May Be Injured.

In This Job Considerable Excess Cable Was Left for Cutting in the Box. It Is Still There.



Waste of Aerial Cable Through Too Much Cable Being Left for Cutting in Terminal Box.



Box Located so Close to Barn That Door Will Not Open Clear. Anchor Guy Crosses Door. Probably Will Have to Be Readjusted.

Illustrations of Wasteful and Inefficient Methods Used by Telephone Workmen. Compiled by Alonzo Burt, Vice-President of the Central Group of Bell Companies Under the Caption "Waste Nothing."

STORIES IN PICTURES OF TELEPHONE PRACTICE AND PROGRESS IN ALL PARTS OF THE WORLD.

Rochester Bondholders in Agreement

Nearly all the general mortgage bondholders of the Rochester Telephone Company have approved the plan of the directors and have consented to accept instead of two years' interest on their holdings new bonds to the amount of that interest.

According to the plan, the bondholders will not give up any interest, but will convert it into interest-bearing securities to enable the company to make extensions. The amount that can be obtained by this plan is $100,000. To this the company will add its surplus earnings during the two years that the plan is in force so that there will be available for service extensions $200,000.

The contract for placing the new switchboard at the Stone exchange of the Rochester Telephone Company has been closed with the Stromberg-Carlson Telephone Manufacturing Company, and the work will begin immediately.

Capacity for 15,000 direct lines will be provided. The present "B" board in the exchange will be scraped, the lines which it at present carries being tied into the new board, together with a large number of new services which will be made possible by the added capacity. Additional trunk lines will be built between Stone and Park exchanges, adding to the efficiency of the general service. The new board will cost about $28,000.

Big Independent Combination in Ohio

Control of fifteen independent telephone companies operating in Ohio has been purchased outright, by a syndicate of Ohio people from J. P. Morgan & Co., of New York, and will consolidate them under the name of the Ohio State Telephone Company, the new company being in no sense a holding company. The following are the companies which the Ohio State Telephone Company will acquire:

The United States Telephone Company, the Cuyahoga Telephone Company, Columbus Citizens Telephone Company, Home Telephone Company, of Dayton; Washington Home Telephone Company, Toledo Home Telephone Company, London Home Telephone Company, Stark County Telephone Company, Youngstown Telephone Company, Columbiana County Telephone Company, Zanesville Telephone & Telegraph Company, Findlay Home Telephone Company, Lancaster Telephone Company, Massillon Telephone Company, Citizens' Telephone & Message Company of Fostoria.

The outstanding capitalization of the new company will be $23,466,200 as against an aggregate capitalization of $25,815,976 of the companies going into the consolidation. The outstanding capitalization of the new company will be divided as follows: Common stock, $5,206,000; preferred stock, $4,850,000; refunding bonds, $5,000,000; underlying bonds, $8,060,200. The common stock authorized will aggregate $7,500,000. The preferred stock authorized will aggregate $10,000,000, and will be a 7 per cent cumulative stock, preferred both as to assets and dividends. The authorized new mortgage will be $20,000,000, of which $8,060,200 will be held in escrow to take up underlying bonds at maturity and $5,000,000 will be outstanding. Through the sale of certain securities, included in the amount given above as being outstanding, the company will have on hand about $2,850,000 which will be used for permanent improvements and for the purpose of paying floating indebtedness of various companies, aggregating about $500,000.

A survey of the properties involved in the deal has been made by one of the leading telephone engineering firms of the country and recommendations for improvements and extensions have been made. Inprovements will be started at once in Cleveland, Columbus, and Toledo.

Based upon actual average earnings of the constituent companies for the last five years as ascertained by audits made by certified public accountants and applying such actual average earnings to the proposed capitalization of the new company, the result is as follows:

	Second year Increase of 10% added	First year actual average Earn. for 5 yrs. end. Dec. 31, 1913	Third year estimate of earn. taken from report of McMeen & Miller Engineers
Net earnings from all companies	$1,304,074.19	$1,434,481.61	$1,710,612.31
Less depreciation	340,000.00	374,000.00	500,000.00
Net earnings from all companies available for interest and dividends	$ 964,074.19	$1,060,481.61	$1,210,612.31
Add: Interest earned from cash on hand	30,000.00	.....	.....
	$ 994,074.19	$1,060,481.61	$1,210,612.31
Less: Interest on outstanding bonds of constituent companies	403,010.00	403,010.00	403,010.00
	$ 591,064.19	$ 657,471.61	$ 807,602.31
Less: Interest on bonds of new company, 3% for first two years, 4% for third year, and 5% thereafter	150,000.00	150,000.00	200,000.00
	$ 441,064.19	$ 507,471.61	$ 607,602.31
Less: 7% on $4,350,000 preferred stock for two years and $4,850,000 thereafter	304,500.00	304,500.00	339,500.00
Net for common stock	$ 136,564.19	$ 202,971.61	$ 268,102.31
Per cent	2.6	4.	5.

The above result is reached without any allowance for savings economies, which will undoubtedly result from the consolidation. The board of directors of the new company will be composed wholly of Ohio men and will be as follows:

Charles A. Otis, president of the Cuyahoga; Harry Coulby and F. F. Prentiss, of Cleveland; F. R. Huntington, president of the Huntington National Bank; E. R. Sharp, president of the State Savings & Trust Company, Frank A. Davis, president of the Columbus Citizens and U. S. Telephone Companies, and Samuel G. McMeen, of Columbus; Clarence Brown, Toledo; Geo. D. Eustis, Cincinnati; D. J. Cable, Lima, and Frank L. Beam, Mt. Vernon.

Frank A. Davis, now president of the United States Telephone Company and the Columbus Citizens Telephone Company, will be chairman of the board of directors of the new company.

The president of the Ohio State Telephone Company will be Samuel G. McMeen, of Columbus. Mr. McMeen has been identified with the telephone business for thirty years. He built and managed telephone plants in San Francisco, Oakland and Berkeley, Cal., and in Illinois.

The deal, of course, will have to be approved by two-thirds of all the stock of each of the fifteen companies and by the Ohio Public Utilities Commission. The necessary stockholders have already agreed to vote for the deal, and it is understood that the Ohio Public Utility Commission has informally stated that it will approve it.

Organization for Clearing Storm Troubles

Paper Read Before the Association of Railway Telegraph Superintendents

BY J. C. HUBBARD*

IN discussing this subject, I will first describe briefly the organization of the forces of the superintendent of telegraph and of the telegraph company that construct, reconstruct, and maintain the pole lines and are available for the emergency work of restoring service interrupted by storms, and then outline the work to be done and point out any changes or additions that should be made to do the emergency work as promptly and satisfactorily as it is possible to do it.

ORGANIZATION OF SUPERINTENDENT OF TELEGRAPH'S FORCES AND DUTIES.

Charts showing three types of organization for a superintendent of telegraph's forces and one showing that of the telegraph company have been prepared and will be found here. No effort has been made to adopt one standard organization for the superintendent of telegraph for the reason that in actual practice there is considerable variation in the size of the forces and their organization. The three types outlined, however, while not worked out in detail, are shown with sufficient clearness to illustrate the probable size and character of the forces of the superintendent of telegraph for the purpose of the discussion contained in this paper. The matter would be very much simplified if there could be one type of organization, but that is impracticable—in fact, impossible—because the superintendent's forces must be made up to perform the duties outlined in the contracts between the railroad companies and the telegraph company, and these are of almost infinite variety. It must be understood that it is not the intention to specify any particular type or organization for the superintendent of telegraph in this paper. That is a subject of such importance and interest that a separate paper might be prepared on it alone. Generally speaking, the superintendent of telegraph receives instructions from the railroad company to provide for it certain wire facilities and to arrange for the operation and maintenance of those wire facilities and the railroad company also instructs him concerning right of way matters, transportation of men and materials, the expenditure of its proportion of the cost of performing work, and other matters concerning the telegraph system with which it is particularly concerned, and all matters specified in the contract. He receives instructions from the telegraph company regarding its wire facilities, their use and maintenance, its standard specifications for lines, cables, material, etc., the expenditure of its proportional cost of work and other matters as may be prescribed in the particular contract under which he is working.

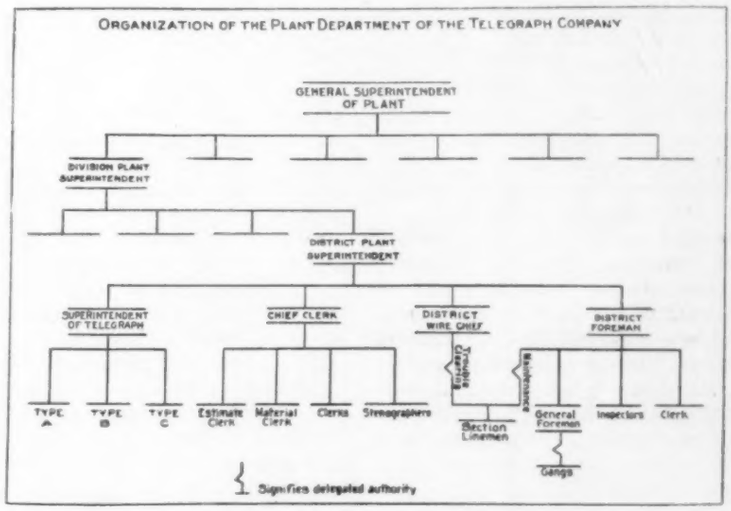


Plate 1

One thing that is clearly obvious is that the superintendent has two bosses, and while he should not receive conflicting instructions on one subject from both of them, that sometimes happens and then he shows whether or not he is in training for the diplomatic corps. This introduces the most difficult part of the entire organization scheme, namely, to find a man to fit into this difficult position who can be absolutely impartial and fair to both of his employers at all times.

However, this is a condition that must be met, and to make it easier for him an attempt should be made to outline the duties so that there can be no mistake as to his responsibility to each party to the contract. The fact that the superintendent is a joint employe makes it all the more necessary that the duties shall be clearly defined, and while I do not believe that it is possible to formulate a set of rules which it is practicable for a superintendent of telegraph to follow exactly, I think the parties to the contract can give him a great deal of assistance by making some general rules defining the contract requirements which he can follow under ordinary or average day-to-day conditions.

In order that the organization charts may be clear and their purpose understood, I will outline briefly some of the principal duties of the superintendent of telegraph under each. The selection of the type is, of course, determined by the provisions of the contract with the particular railroad involved.

In the type "A" organization, the superintendent of telegraph has no responsibility for the construction or maintenance of the telegraph lines. He represents and acts for both companies on all matters of traffic and commercial business between the two companies. His forces are not large unless he is given special duties by one or both of his employers, the railroad and the telegraph company. Examples are when a joint superintendent is put in charge of all signal work for the railroad company or made a district superintendent by the telegraph company. Under this type of organization the telegraph company constructs and maintains the lines, wires, etc.

In the type "B" organization, he has all the duties outlined in "A" and is also in charge of some of the construction or maintenance work on the telegraph lines. In some cases he has charge of

*General supervisor of lines, Western Union Telegraph Company, New York.

the construction or maintenance work, employing gangs of men for that purpose, and in others he has charge of station linemen, but in no case does he have charge of both kinds of work.

In the type "C" organization, he has all the duties of "A" and "B" organizations outlined above and is responsible for the construction and maintenance of the pole lines, wires and other property used in the telegraph business.

It is obvious that where type "A" or "B" organization exists the work of the superintendent of telegraph is very different from what it is when type "C" is used. In general, when type "B" organization is followed the superintendent will not be assigned any active part in the work of restoring service after storms and such work will be done by the telegraph company. The method of handling this condition is described in the pages that follow.

Where type "C" organization is followed, the work of restoring service falls on the superintendent of telegraph normally, and it is done by him when his forces are large enough to complete it within a reasonable length of time. In case the regular forces are inadequate, he will be assisted by the telegraph company with such additional forces and in such manner as may be necessary to restore service promptly.

ORGANIZATION OF TELEGRAPH COMPANY'S FORCES.

The organization diagram of the telegraph company is intended to show only a general outline of the forces that are normally used on construction, reconstruction and maintenance work. These forces are responsible for the condition of the lines when such responsibility is not placed on the joint superintendent of telegraph. This type of organization is used to restore service when that duty falls directly on the telegraph company, as is the case under the type "A" organization and sometimes under the type "B." It is used to assist or relieve the superintendent of telegraph when his forces are inadequate to perform the temporary work of restoring interrupted service within a reasonable time.

NATURE AND AMOUNT OF DAMAGE.

Having described the forces that are engaged in the construction, reconstruction and maintenance of the telegraph plant and are always available for work on storm breaks, I will next describe the conditions and methods of handling the work. It will be seen that by combining the full organization of both the superintendent of telegraph's and the telegraph company's forces there could be assembled a large body of men, which could probably handle any work, however large, that might be necessary to restore service interrupted by storms. Therefore, it is merely a matter of deciding what part of the forces shall be called into action and how they shall be directed. Now in order to decide these important questions, it is first necessary to get before us a complete description of the work to be done. Storm troubles, for the purpose of this paper, include those caused by sleet, snow, wind, floods, etc., that require the use of some gangs and other field forces in addition to the regular station linemen. The sleet storm is generally the most troublesome, and as they are of frequent occurrence in some parts of the plant, that is, we have them every year in one division or another, I believe that all the essential points in any job of restoring interrupted service will be brought out in a discussion of a sleet storm restoration. Damage by floods, fires, etc., also require the attention of an emergency force, but these interruptions are not generally extended over large areas and are of less frequent occurrence, therefore less troublesome than sleet storms. However, these remarks will be generally applicable to the work of restoring service interrupted by other causes.

The first thing to do when a line fails is to find out where the failure is and the nature and extent of the damage.

Information on these points should be obtained from the forces who are responsible for the day-to-day maintenance of the lines and clearing of wire troubles, that is to say, from the linemen and wire chiefs who are always on the line and are the first persons to know of wire troubles.

These men, because of their knowledge and responsibility for the service, should give notice to their superiors in case of serious damage to lines that a situation has been created with which they are unable to cope. In requesting assistance they should, as far as practicable, report the condition of the damaged plant. As a rule, in case of a sleet storm, we have some warning of its approach and can, in a measure, be prepared by notifying the linemen, and others on whom we depend to gather information, as to conditions and the general foremen, who will notify gang foremen to keep in touch and be prepared to move promptly. Linemen are held in readiness to start quickly to cover the lines as soon as heavy losses occur or communication is totally cut off. Furthermore, the wires fail gradually at first and communication is maintained for a time so that wire chiefs have considerable information as to the extent and intensity of the storm through the progression of the trouble.

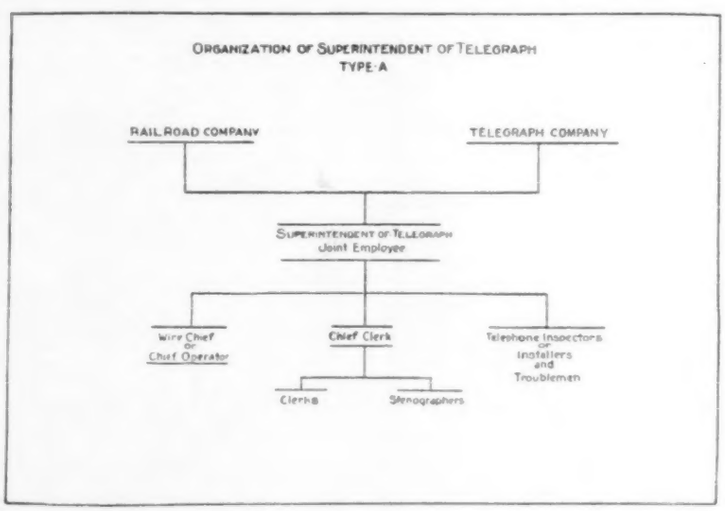


Plate 2.

Let us assume that the type "C" organization is in effect on a railroad where a sleet storm has occurred and the superintendent of telegraph, representing the two parties to the contract, is in charge of the reconstruction and day-to-day maintenance of the telegraph plant. When a line fails, or a majority of the wires carried on a line fail, as in this case, the regular lineman for the section should be sent out to find its condition. He should be furnished with all the available informa-

tion as to the condition of the line and wires, and any other general information that will aid him in making the investigation.

In cases where the lineman is located at a distant point from the wire chief, he should, in the absence of definite instructions, start at once after service is interrupted and cover the line toward his headquarters or cover the most important trunk line in his section, if there is more than one, and report to his wire chief, general foreman, superintendent or other superior to whom he normally reports. If near headquarters, or he can reach there quickly, he should report there with such information as he can obtain en route and receive instructions. All linemen should be instructed as above so as to avoid any delay or misunderstanding as to their duties at such times.

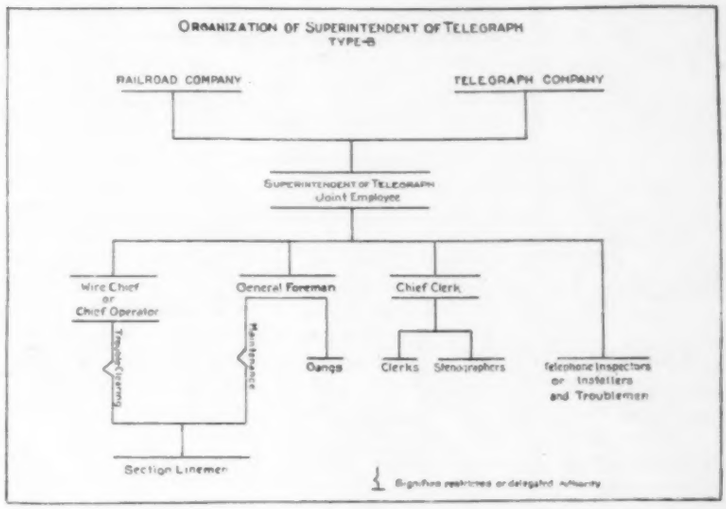


Plate 3.

The lineman is, of course, experienced in line construction and maintenance work and is able to survey the line from a construction man's point of view, and will make notes of conditions and report them accurately, and also furnish certain general information which will enable his superiors to form an opinion as to the size of the force, quantity of material, cable, etc., which should be provided to start the preliminary work. In the event that the extent of the damage is so great that the regular stationed linemen are unable to cover all of the lines quickly, extra men, such as inspectors, foremen, or general foremen, should be sent over the lines to obtain the preliminary information desired. It is, of course, desirable to have men who have some knowledge of the line and local conditions, but there is no reason why any experienced, competent man cannot obtain the necessary data if he is furnished the general information as to location of the line and properly instructed as to what is required.

Whoever is sent over the line should have a notebook, preferably one that is specially prepared and ruled, so that notes can be made rapidly and accurately while observing the conditions from a moving train. Sample sheets taken from a notebook recommended for this purpose are included in this paper. I consider it unnecessary to have special notebooks, but one specially ruled should be used and a code of abbreviations arranged for, so that the data may be recorded by means of check marks as far as possible, as it is impracticable to do very much writing under the conditions. The record made by the lineman or inspectors should contain the following information:

Date, time, the place of starting, name of line, route, general description of the line, such as height of poles, number of poles per mile, number, position and kind of wires, size of crossarms and location of line with respect to track. Other general information, such as line hazards, construction difficulties, etc., which is ordinarily in the possession of the linemen or readily obtainable by observation of the line, or from wire chiefs or superintendents of telegraph, should be included also. The method of traveling should also be noted and the following information recorded for each pole and section of line: First, condition of each pole, that is, whether down, leaning, or standing; second, the condition of the wires in each span. Notes should be made in the remarks column on the general condition of the crossarms and other points of interest. Generally, if the condition of crossarms between stations is given that will be sufficient for the preparation of plans for doing the temporary work. The character of the work to be done should be noted when such information will be of value. Sufficient data should be recorded to enable the general foreman to decide on the type of line to be used in restoring the service; that is, whether wires are to be picked up and spliced out; whether poles are to be straightened up; whether jury line is to be built, or emergency cable is to be used.

This may sound like a very formidable report to require of a lineman, but the matter has been given very careful consideration and in actual trial it has been found that the report can be made very satisfactorily by the average linemen and inspectors, or other persons who are more accustomed to writing, can add considerable information to that specified in these reports without any particular difficulty. To others it may appear from an examination of the report sheets that they do not contain enough information; but if the notes are accurately made, we will know the condition of each pole and the general condition of the wires in each section. This is all that we really need to know in order to start the temporary work; in fact, all that we need to know to restore the service. The specific condition of the crossarms and of the guys, and other things, are really not essential to the preliminary work. The work of making up these reports should be discussed with linemen, by wire chiefs, general foremen or others during the summer months or at times when station men are in the office or some of the supervising force are out with the linemen, so that they may realize the importance of collecting accurate information as to line conditions at such a time.

Preliminary reports of line conditions are often obtained from train crews or persons who are traveling over the road. Sometimes this information is reliable, but more often it is inaccurate and misleading; and it should not be used at its face value unless the superintendent or other official to whom the information is given knows the person furnishing it and can vouch for its being correct. Such information should, of course, be used if it is found reliable, as a basis for taking at least the preliminary steps for starting the repair work. That is to say, if the superintendent knows from local evidence that the sleet storm is a severe one and then receives a report from a train crew that the line is entirely destroyed for a distance of several miles, he would be

justified in ordering cable and gangs to some headquarters or other place which would be a good starting point to take up the work. However, it is generally possible to get someone over the line and obtain reliable information before very much can be done in moving men or material. It is hardly necessary to say that much time is wasted and considerable expense is often incurred by attempting to move a large force of men and distribute material and cable before facts as to the extent and location of the damage are ascertained. Therefore, first efforts should be made toward getting men over the ground who are thoroughly competent to gather full information about the damage. No time should be lost or expense spared in doing this thoroughly. If there is any doubt as to whether a line is being covered, men should be sent out to cover it even at a risk of its being covered twice, as the cost thereof is not very much when compared with what may be lost if gangs of men are distributed where they cannot accomplish the quickest results.

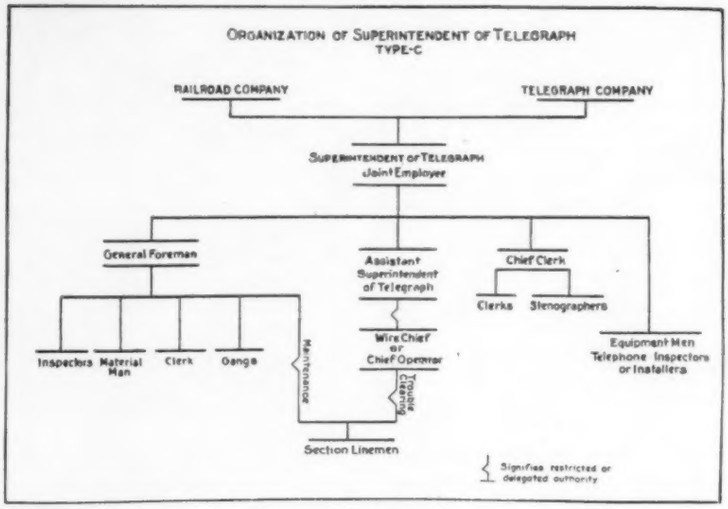


Plate 4.

The lineman should make a summary of his report as soon as possible, that is, at any stopping point or as soon as he arrives at the end of his section. Such reports should preferably be made by the lineman in person to his superior. If it is impossible to do this, a brief summary of the notes giving the number of poles down, the average number of wires broken in the damaged sections and other essential information should be forwarded at once by telegraph. If the report cannot be made by telegraph, it should then be made by telephone, by special messenger, or by mail if there is no other way to transmit it. Generally the lineman should report to his office as soon as possible after the first day's inspection, or after he has covered enough of the line to obtain information that will enable the superintendent to take up the repair work. By doing this, work may sometimes be started in the section covered earlier than if he continued to inspect his entire section. The lineman, after making his report, may then return to inspect the uncompleted portions, or it may be completed by some other lineman or inspector as is found advisable. The efforts of the lineman to obtain this information will be directed by the wire chief, the general foreman, or the superintendent of telegraph, to whom he normally reports. If the damage is slight and the work of restoring service can be performed by the section lineman and a few assistants, he should so advise his superior, who will instruct him to undertake the work in accordance with his regular organization. If the work is of such an extent that the use of gangs is necessary, the lineman's superior will so inform his superintendent, or other authority, who will make whatever arrangements may be necessary to obtain the additional forces, material, cable, etc., required for the job. Having obtained the necessary information as to the condition of the line or lines, the superintendent of telegraph working under type "C" organization will undertake the repair and reconstruction work with forces working under his immediate direction. This important work is assigned to the general foreman in charge of all gangs and having in his employ inspectors, material men, general workmen and a small clerical force sufficient to handle reports, expense accounts, etc. The general foreman, having been notified when the first warnings of storm are received, is therefore thoroughly familiar with all the facts and has made preliminary moves necessary to get his gangs at convenient points to take up the work and has material men preparing orders for cable and material, such as wire, sleeves, tie wire, cable and tools, that will be required at once for use in the temporary work.

As soon as detail reports from the lineman are received, the general foreman should examine the reports and have the information shown graphically on a map. He must do the work personally or supervise the clerical force which does it. A copy of such a map is made a part of this paper. Maps of this kind have been used in a number of cases by the writer and found to be very useful. In fact, something of this description is indispensable for efficient work. This particular map was made up with a view to having the symbols of such a nature that they would show clearly on a blue or white print.

The aversion of the average general foreman and other men, whose experience has been principally on the outside field work, to the use of such maps is well known, but I believe that by a little missionary work the most of our general foremen will adopt this scheme of mapping the damage, and I am certain that after they have become accustomed to using it they will appreciate its advantages. After the information has been put on the map, the general foreman can readily determine the number of gangs which should be employed, the amount of cable required, the points at which gangs should be located and at which cable and material should be distributed. He will be able to estimate roughly the time required to make some wires good. He will consult with his superintendent, who, after consulting with the district superintendent of the telegraph company, will advise the general foreman as to the number of wires that are to be made good in the first preliminary work. He will have arranged through the superintendent for work trains and other facilities for transporting men and material, and will then proceed with his gangs and staff, such as inspectors, material men and others, who are required to take up the work.

A general foreman should always have one or two extra, unattached men who may be dispatched to out-

lying points to carry instructions, distribute material or do other work which would otherwise require his personal attention. The general foreman should devote his time to studying the condition of the line, to distributing gangs and material, and to instructing the foremen and inspectors who will assist him by handling some of the gangs. In this way he will have a chance to check up the information obtained by the linemen and see that the information is approximately correct before he arranges to distribute cable on an extensive scale. He should, after starting the repair work, arrange to cover all the line or lines in his territory that are seriously affected, or such of them as he will be called upon to restore service on, and check up the reports which he has received and perfect plans for continuing the work. He should give instructions as to the character of work to be done and the use of new or old material; designate places where emergency cable is to be used, and give definite and detailed instructions as to its distribution. He should see that all work trains are properly manned and that they are not overmanned. He should see that all temporary work is done in such a manner that reliable and dependable service will result. He should arrange for a sufficient number of cable splicers and testers to splice and test all cables and to tag and number for the purpose of identification each cable not equipped with permanent leather markers and brass tags. Each piece of cable should be tested before it is connected into the line.

He should obtain a daily work report from each cable splicer and tester, giving a complete record of the number and location of all splices made by each splicer and the condition of the wires in each section of cable. This should be kept as a record for use in checking up any trouble that may later develop in the cable. He should personally supervise some of the splicing and arrange to have a representative, such as an inspector, an assistant, or competent foreman, take charge of all splicing, who shall check all work of this kind.

He should require a daily written work report from each gang foreman, each inspector and each material man on the work, and he should also require reports by telegraph, by telephone, or in person from such of these men as necessary, to inform him of the progress of the work. The daily work reports from foremen shall list in detail all of the work actually performed, that is, the reports shall contain such statements as: "Set jury line or temporary line for twenty poles, starting at mile post 146 and extending south; strung and tied in ten wires over the first fifteen poles set." There seems to be an opinion among some of the superintendents, general foremen and others that it is unnecessary for foremen to make daily report when engaged on emergency work, and in some cases instructions have been sent out that reports be entirely discontinued at such times; in other cases reports have contained only such meager information that they served no useful purpose. It is very necessary that these reports be made promptly and the general foreman should see that this is done. He should post all progress reports on the graphical map each day and use it in planning the work for the following day and in making reports to his superintendent.

He should see that the temporary line is free from unnecessarily long spans; that all terminal poles are properly head guyed; that all cable is suspended by messenger strand at track crossings, and at points where long spans are necessary, and that cable at all points is properly secured and kept clear from the ground. He should arrange for the regular station linemen to cover all temporary work, to familiarize themselves with conditions and to clear troubles that may come in, and assign such additional experienced men as are required to do the work promptly and also to continually patrol the temporary cables.

He should arrange to have underground and all station or other permanent cables in the line tested and put in serviceable condition. This work should be started directly after the storm, so that such cables may be ready to be connected up when the lines are made good. He should arrange for daily tests of each section of line where wires have been connected either through cable or open line, and assure himself that they are in working condition and will afford service when they are finally connected through.

He should arrange as soon as possible after the temporary work has been started to have a pole-to-pole inspection made to determine, in detail, the extent of the damage and to have locations for the new poles, fixtures, etc., made and data collected to be used in making estimates and plans for the permanent work. In planning for the permanent work, any matter involving changes in the pole line, the wire layout, character of the wires and other such matters should be considered before the inspections are made. This data should be turned over to the material clerk, who will, acting under instructions from the general foreman, order such material for temporary and permanent work as may be required to carry on the work. He should keep a record of all material furnished and used, and of all junk recovered. Care should be exercised to see that no duplicate orders are placed and that material is ordered in such quantities as to insure its being used within a reasonable length of time. Particular attention should be given to the time when material is to be used so that orders may be scheduled on suppliers insuring better deliveries and more satisfactory service from every point of view, and furthermore reducing the investment in material and the chances for losses, which are always great when material is distributed along rights of way for a considerable length of time. He should furnish the necessary data and information for the preparation of estimates to cover the temporary and permanent work to be done on the lines. These estimates must be made up as soon as possible after the damage occurs. He should make a thorough check of all expenditures of money and of the use of old and new material. The latter kind should be used whenever practicable. Copper wire that has been wrecked should be very carefully examined and if found to be injured so that its tensile strength is lowered, it should be junked. All material should be disbursed and used with the same care that is exercised in handling money.

AMOUNT OF WORK TO BE DONE.

A general foreman should be assigned only such mileage as he can personally cover each day and instruct the several foremen, inspectors and others and closely supervise the work of all. This means that he must be out in the field each day and in close personal touch with these forces.

In the event that the work is so extensive that the superintendent of telegraph's forces cannot restore service within a reasonable length of time, the superintendent of telegraph should call upon the telegraph company for assistance.

No fixed rules can be made for determining when a superintendent of telegraph should be assisted by the telegraph company, but each case should be decided ac-

cording to the amount of damage and the character and importance of the service involved.

It is always advisable in cases of emergency to have too much rather than too little help, and so when in doubt it is best to call for assistance. The telegraph lines are constructed to provide a means for rapid communication by the railroad company in handling its trains and doing a general business and by the telegraph company for transacting a general telegraph business, and neither company can attain the results desired when the lines are out of service and, therefore, the importance of immediate restoration of lines is very plain.

The superintendent of telegraph should consult with the railroad officials as to its wire requirements and then confer with the district plant superintendent, who will furnish additional help if the forces of the superintendent of telegraph are unable to perform the work within a reasonable time.

FORCES OF THE TELEGRAPH COMPANY.

The organization diagram of the telegraph company shows only a general outline of the forces and is intended to cover such of them as are used in construction, reconstruction and maintenance work. These forces, or such part of them as may be required, are used to assist or relieve the superintendent of telegraph in cases where type "C" organization is followed and to take the full responsibility when type "A" organization is followed and to assist or take full responsibility when type "B" organization is followed. The organization of the telegraph company is substantially the same, so far as the general foreman's forces are concerned, as that of the superintendent of telegraph. The gang is the smallest unit force that is dealt with specifically in such work, but generally speaking, it is advisable that the general foreman, who is normally in charge of the gangs, instruct them on work of this character. It is more important than straight work and requires more supervision, and hence the necessity for a general foreman to accompany every three or four gangs while the temporary work is being done. Any force furnished by the telegraph company or by the superintendent of telegraph should include a general foreman. Therefore, we will consider a general foreman having in his charge two or more gangs as being the smallest unit force that should be used by the telegraph company to restore lines when the work is too great for the superintendent of telegraph to do with his forces.

The number of general foremen that are furnished by the telegraph company will depend entirely upon the amount of work to be done and the time in which it is to be completed. When two or more general foremen are used, a district foreman will be furnished to supervise the work, and if the work is of such an extent to make such a course advisable, the division superintendent, through his supervisor of lines, will take charge of and direct the forces. This should be done whenever a large territory is affected and important trunk line railroads or main telegraph lines are involved.

In cases of general prostration of lines affecting the principal offices of the telegraph company or important trunk lines, the division superintendent of plant will be advised by the general superintendent of plant as to the plans to be followed. In such cases a representative of the general office will, when it is advisable, be temporarily located at the headquarters from which the restoration work is being directed.

In case the services of a district foreman are required, he will act as a supervisor over general foremen, handling their reports in the same way that he does under his normal organization. This means that he will receive all daily work reports from gangs, that he will prepare a graphical map of the sections on which he is responsible for the work, and make definite plans for carrying on the work, transmitting his instructions to the gang foremen through the general foremen, inspectors or others in charge of those men. He should familiarize himself thoroughly with the condition of the lines. In case he is assigned the supervision over general foremen or gangs with whom he is not personally acquainted, he should spend sufficient time with them to enable him to estimate their ability and capacity for performing the work in hand. He should receive instructions from and report to the district superintendent.

The superintendent of telegraph should in all cases consult with and be advised by the district superintendent, who will in all cases consult with the division superintendent and be guided by his advice as to the forces required and the methods to be followed in doing the work. In order to avoid any possible confusion that may arise by in the introduction of forces other than those ordinarily used by the superintendent of telegraph, it is advisable to work such forces separately. This can generally be done very satisfactorily by dividing the work into geographical divisions and assigning to each force a particular section or sections of the line. There is another advantage in doing this, and that is, there is a tendency to produce a certain spirit of rivalry between the different general foremen which will enable these men to create a greater interest in the work among their own foremen.

The forces of the joint superintendent may work with or independently of those of the telegraph company, but whatever method is followed, there must be a complete understanding between the general foremen or between the district foreman and the forces of the joint superintendent as to where work is to be done and methods to be followed, so that uniformity of work will result and the different sections will be completed simultaneously. The district superintendent or the division supervisor, if he is on the ground, should confer with and work with the superintendent of telegraph to accomplish this result. These men should clearly define the work to be done to their subordinates, so that there can be no misunderstanding. Both companies desire to have wire service at the earliest possible moment, and all other questions, as to who is responsible, or who is not responsible for some work that has not been done, or has been done improperly, or who got there first, or who did this or who did that, should be lost sight of and all should work toward the one end, that is, to re-establish wire service quickly.

STOCKS OF MATERIAL AND CABLE.

It is the practice of the telegraph company to furnish to the several railroad companies a stock of all kinds of material for current use in constructing and maintaining the outside plant. This includes poles, wire, tie wire, sleeves, crossarms, guy wire, anchor rods, and, in fact, every kind of material that is used. These stocks are maintained primarily for maintenance purposes, but they generally contain enough material to supply linemen and a small force of men, that is, one or two gangs, with enough material to start work on repairs after storm breaks. The telegraph company maintains a considerable stock of the same class of material at practically all dis-

trict headquarters and also a large stock of material at four warehouses located at New York, Chicago, Atlanta and San Francisco. It also maintains a division stock of certain classes of material at Chattanooga, Tenn., and Dallas, Tex., and in addition as pole yards at Chattanoga, Tenn., Brisbane, Ill., and Emeryville, Cal. As soon as possible after a storm occurs, orders should be placed on the district storerooms and on the general warehouse for the material that is required immediately. These warehouses have been able to furnish enough material to take care of the situation.

The telegraph company also maintains at each division headquarters a special stock of rubber emergency cable of various sizes and twisted pair wire. It maintains a certain amount of cable at district headquarters and at other points where conditions warrant so doing. In the past the practice has been to use regular stocks of nineteen conductor, five-pair and ten-pair rubber cable for emergency use. This practice was very satisfactory when cable manufacturers were prompt and delivered the cable on schedule time, but sometimes difficulties arose which prevented that, and as a result the telegraph company was without a sufficient supply of cable. Recently a new type of cable has been adopted which contains three twisted pairs of wires intended for telephone service and fourteen straight conductors. This cable will be generally used for emergency purposes, such as restoring service after storms.

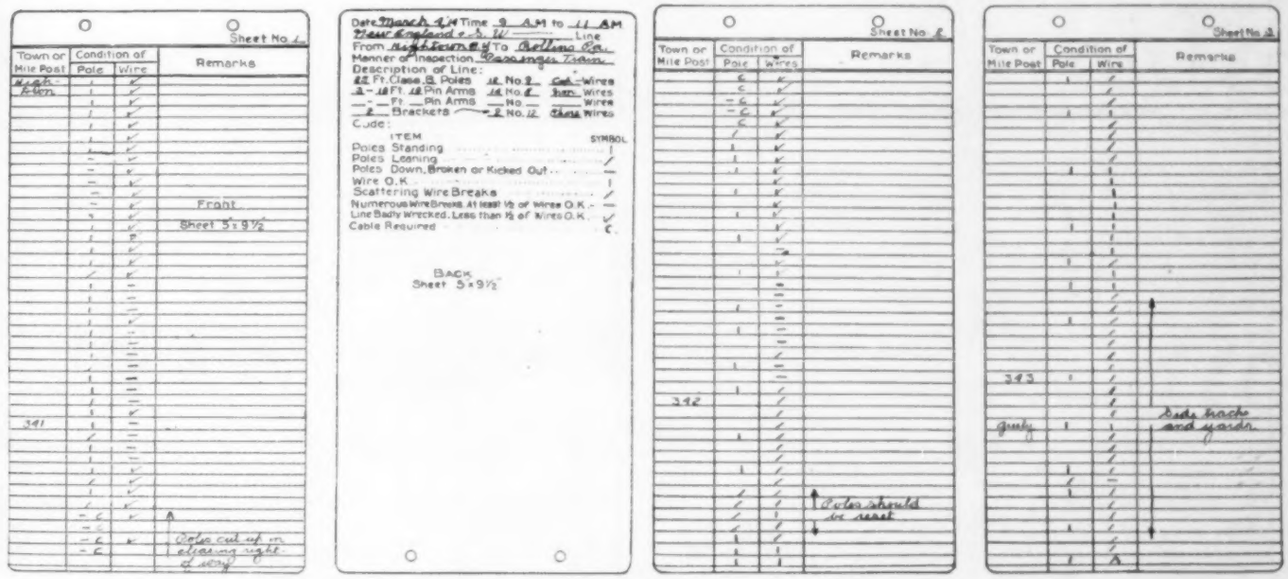


Plate 5.

It is the intention to maintain throughout the year a stock of this cable, it being exclusively for emergency use. In addition to this, at least a six months' stock of cable will be placed in the several warehouses early in the fall, the greater part of which will be available during the winter months for emergency if required. This cable will be shipped out on regular orders during the summer months and replaced with new stock in the fall. This makes the company less dependent upon the manufacturers, as it will always have a certain amount of emergency stock on hand. The exact amount of cable that will be carried in emergency stock has not been determined, but it will be at least seventy-five miles, and it is probable that there will be at least that much available in the general warehouses, so as to make a total of, say, about one hundred and fifty miles of ten-pair or twenty-conductor cable. Some of this will be five-pair or nineteen-conductor cable, but the total amount is figured on the ten-pair basis, as this is the size most generally used in the sections where the heaviest trunk lines are located. This also happens to be the section where sleet storms are of the most frequent occurrence, and for that reason the larger size cables are the most desirable. The telegraph company also provides a stock of approximately one thousand miles of No. 9 B. & S. G. copper wire, about five hundred miles of iron wire with suitable stocks of sleeves and tie wires at the four warehouses. The largest stocks are, of course, placed at Chicago and New York, the headquarters of the two divisions located in the territory where sleet storms are most frequent and destructive. Poles are obtained in the case of small breaks from local pole stocks, which are maintained on all railroads, or from district stocks or some one of the three pole yards of the telegraph company, or direct from suppliers. Generally speaking, there is ample time to obtain poles from the woods or large concentrating yards of the suppliers when there is a general prostration of lines.

It may be well to call attention to the fact that conditions are not, as a rule, such that poles can be used for several days after the storm occurs, and therefore they should not be ordered until a careful inspection of the route has been made and the condition of the old poles known. Orders for poles should be based on accurate information. Pole deliveries should be scheduled so that they will not arrive until the principal temporary work has been done, so that forces on such work will not be delayed as they will be if required to distribute poles. Furthermore, the investment is often considerable, and it is decidedly objectionable to have a large number of poles distributed along the right of way which cannot be used for several weeks or months.

My attention has been called to a case where one thousand poles were ordered and distributed along the right of way before the cables, which were put out to restore service, were connected up, and the poles remained on the right of way for several months, and in some sections, where a temporary line was built by means of an

improvised line consisting of short poles on which open wire was strung, the poles were not used for something over a year. This is not good business from any point of view. There is always considerable excitement about getting the poles and other material on the ground, and for that reason the matter of ordering material should be carefully supervised by the superintendent of telegraph or by the district superintendent.

Experience has proved that the present practice of storing quantities of material in the fall, to be held during the winter months subject to emergency call, is satisfactory. This material is sent out on regular orders after the period during which serious storms may be expected has passed. This is generally considered to be about April 1. Of course all of the material is not used immediately and there would be a sufficient quantity on hand to take care of any situation that might arise during the month of April, and there is no danger of sleet storms after May 1. By concentrating the principal stocks of material at district storerooms and at the four large warehouses, the telegraph company is able to furnish material on short notice to any railroad system that may require it. This also applies to cable and to distribution of cable to the various headquarters of the telegraph company. It has been found that cable can be shipped overnight from Chicago or New York to practically any point on a trunk line in either of those divisions, and therefore storing at those points is more satisfactory than distributing to several points throughout each division.

An exception is made in the case of the Cleveland district of the Western division and a considerable quantity of cable is stored at that point.

The region of Lake Erie is probably the most frequented of any territory in the United States by sleet storms, and hence the justification for making an exception in that case. At least ten miles of cable will be stored at this point in the future. A suitable stock of twisted pair to take care of railroad telephone circuits will also be provided. In considering the location of cable stocks, the fact that it cannot always be used immediately, or if distributed on the line immediately, will not result in the recovery of wires, should be taken into consideration. In any extensive sleet storm break, where cable is required, there is work for one or two days by all of the available forces which must be done before the other parts of the line where cable is not to be used are ready for service. Furthermore, a certain amount of wreckage must be cleared away and terminal poles set and anchored for terminating the cable before it can be connected up. Therefore, the gangs can be sent out to prepare the line while the cable is in transit. In some cases cable can very well be shipped by freight instead of by express. However, this is not advocated and, furthermore, first shipments of wire, tie wire and sleeves, as well as tools, which are the first things required, should always be shipped by express or baggage and followed up by heavier shipments by freight.

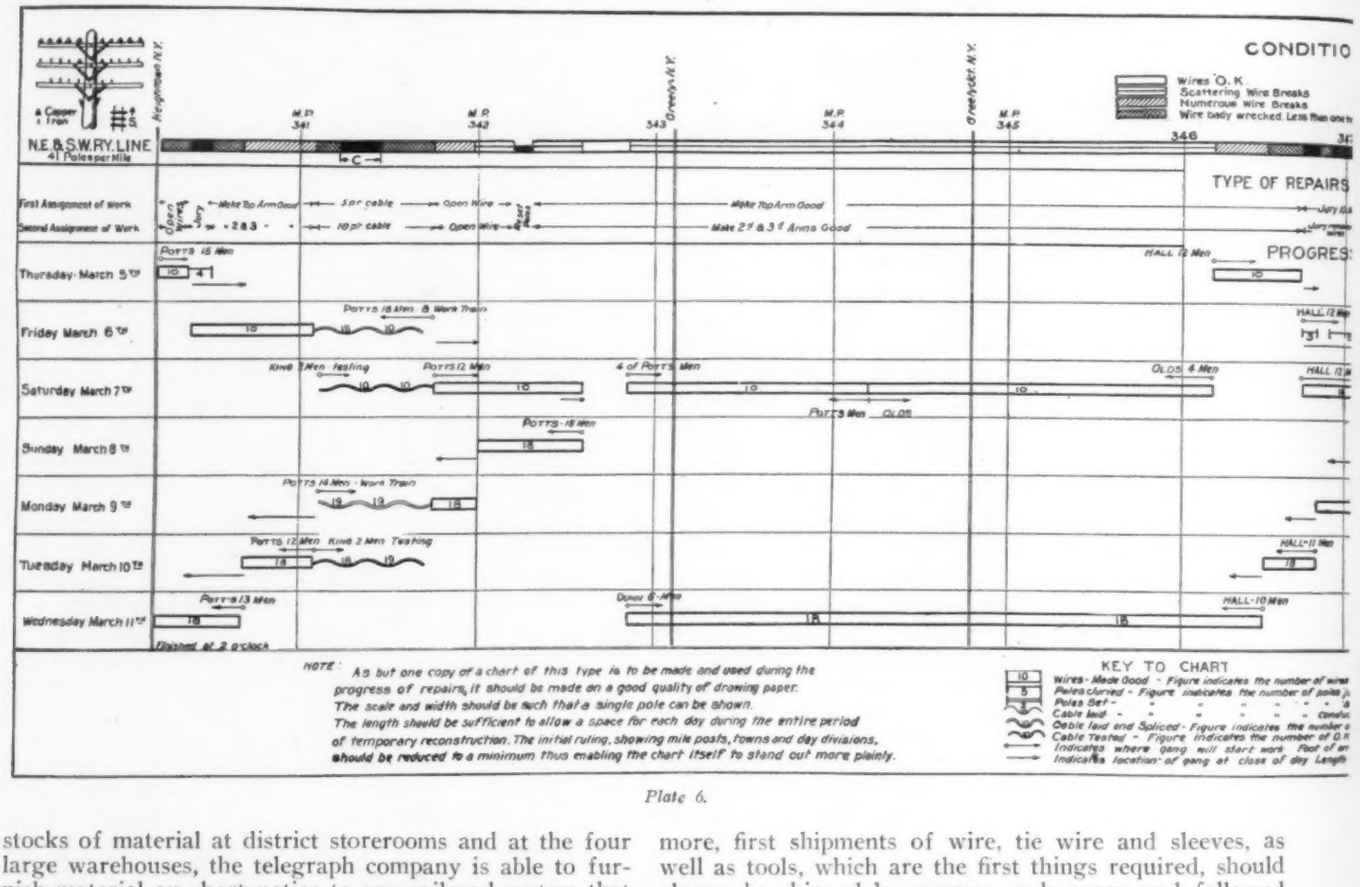

CONDITIO
Wires O. K
Scattering Wire Breaks
Numerous Wire Breaks
Wire badly wrecked. Less than one
N.E. & S.W. RY. LINE
41 Poles per Mile
M.P. 341
M.P. 342
M.P. 344
M.P. 345
346
TYPE OF REPAIRS
First Assignment of Work
Second Assignment of Work
Make Top Arm Good
5 pr. cable
Open Wire
10 pr. cable
Make 2nd & 3rd Arms Good
PROGRES
Thursday March 5th
Friday March 6th
Saturday March 7th
Sunday March 8th
Monday March 9th
Tuesday March 10th
Wednesday March 11th
Potts 18 Men
Potts 12 Men
Hall 12 Men
Hall 11 Men
Hall 10 Men
Kline 2 Men Testing
4 of Potts Men
Potts Men Close
Close 4 Men
Dunn 6 Men
Work Train
Finished at 2 o'clock
NOTE: As but one copy of a chart of this type is to be made and used during the progress of repairs, it should be made on a good quality of drawing paper. The scale and width should be such that a single pole can be shown. The length should be sufficient to allow a space for each day during the entire period of temporary reconstruction. The initial ruling, showing mile posts, towns and day divisions, should be reduced to a minimum thus enabling the chart itself to stand out more plainly.
KEY TO CHART
Wires - Made Good - Figure indicates the number of wires
Poles Dunned - Figure indicates the number of poles
Poles Set -
Cable lead -
Cable laid and Spliced - Figure indicates the number
Cable Tested - Figure indicates the number of O.K.
Indicates where gang will start work. Foot of arrow
Indicates location of gang at close of day. Length

Plate 6.

WIRES TO BE RESTORED FIRST.

In taking up the work of restoring damage after a storm break, the superintendent of telegraph and the district superintendent, after conferring with the district and general foreman and the district wire chief as to the physical condition of the property and obtaining all the information that has a bearing on the situation, shall decide the number of wires which should be first restored. It is never advisable on a trunk line to make less than two wires good at the first attempt and, generally speaking, the entire top crossarm should be made good at one

time. In the case of a small branch line carrying six wires or less, it is generally advisable to carry all of the wires. There are cases, however, particularly where the damage is very extensive and there are no means available for dispatching trains, when it becomes necessary and advisable to provide wires for that purpose immediately. In such cases two wires should be made good for the reason that the work being of a temporary nature, it is unreliable and if only one wire is carried, continuous service cannot be assured. Therefore, with two wires there is one to fall back on in case of failure of the other. Furthermore, when both wires are good, one will be available for the exclusive use of the railroad company in handling trains and the other for the telegraph company's use or joint use.

It is very important to have one wire connected through a break for use as a means of communication between the offices located on the line and by the forces engaged in making the repairs. This is a matter which

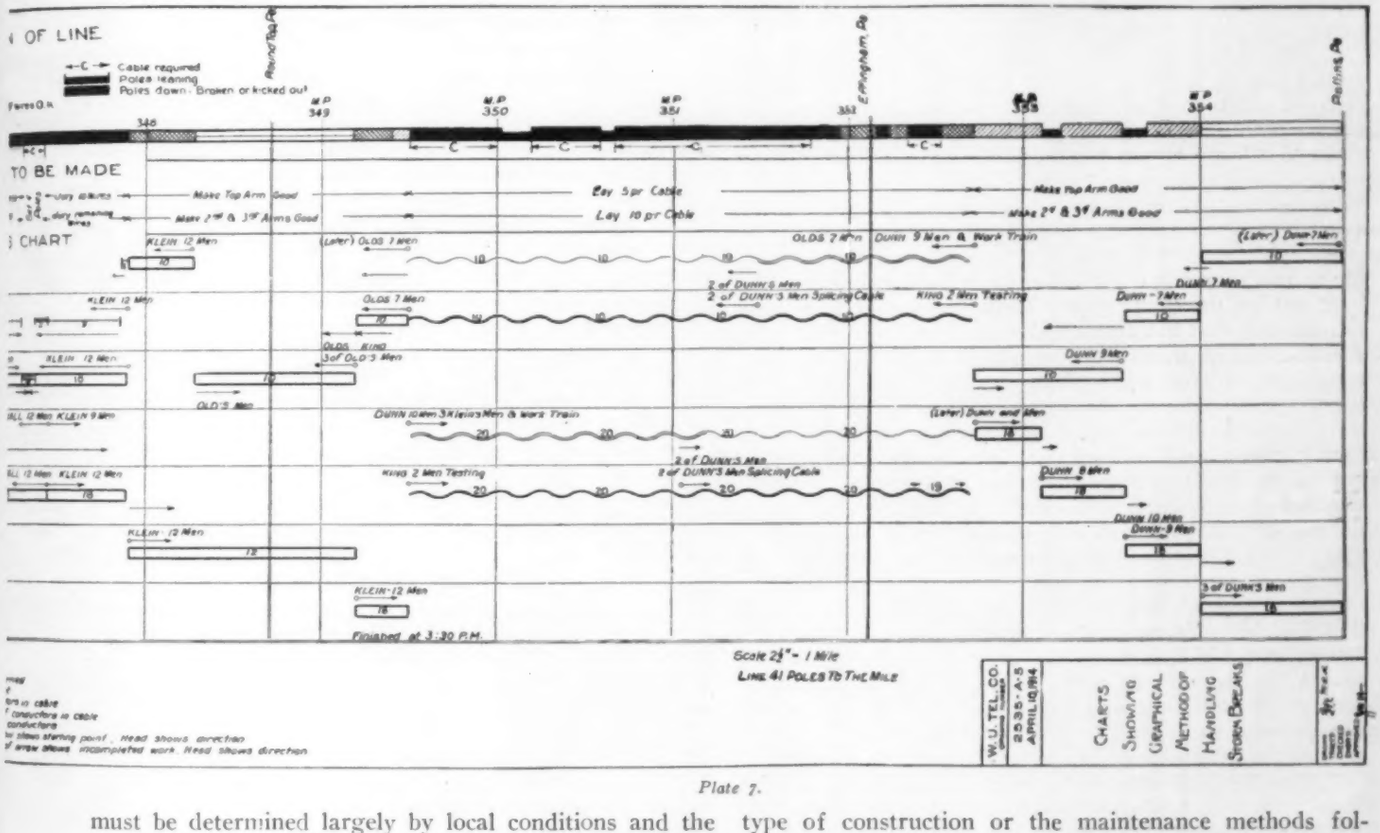


Plate 7.

must be determined largely by local conditions and the demands of the service with which the joint superintendent and the district superintendent and his forces are familiar. It is important that care be exercised in selecting the positions which the first wires restored occupy in case any number less than the entire top arm are made good. They should generally be the end pins on the top arm on the field side of the pole.

When the wires are placed in the position above designated, other wires can be put up and the new poles set with a minimum chance for interruptions, whereas if placed on the track side it is impossible to make headway in putting up other wires without causing trouble. A case is reported where wires were made good by using wire that was found to be intact for a few sections, regardless of the pin position occupied. By following this practice for a distance of several miles, the wires at some point occupied nearly every pin position on the three 6-pin arms on the line. As a result these wires were never in continuous service for any length of time after they were connected. The gangs making repairs had to move them often. The service furnished over these wires was a great disappointment to the telegraph company and to the railroad company, but after having been put in that condition, nothing could be done to remedy it except to handle them as carefully as possible. There is no way of maintaining continuous service on such wires without putting them in cable.

INFORMATION GAINED IN MAKING STORM REPAIRS.

There is a good opportunity when repairing storm break to get information that should be of considerable value in construction and maintenance work. The condition of the plant affected should be carefully observed by the district foremen, general foremen, inspectors and supervisors, with a view to finding any weak points in the type of construction or the maintenance methods followed, so that changes may be made if found advisable. It is a particularly good opportunity to observe the effect of maintenance methods on the line. As a lineman once remarked, and as I have often observed, sleet storms do a very thorough job of inspecting poles, guys and other structures by breaking the lines down in the weak spots. Of course, there are some exceptions to this, as weak sections of line sometimes remain standing when adjacent strong sections go down. No entirely satisfactory explanation can be found for all of these exceptions, but they are partially accounted for by wind currents and freaks of the storm. On the other hand, it is a fact that sections of line containing sound poles maintained in first-class condition will withstand storms which wreck nearby sections containing some defective poles. Of course, strong lines sometimes go down, but these are often pulled

down by the weaker adjacent sections. Pole breaks invariably start at the weak points and therefore the damage from severe storms can be reduced by preventing these weak points from developing, that, is, by first-class maintenance. Let us, then, take advantage of these object lessons and impress upon the field forces the necessity for better maintenance.

GENERAL ORGANIZATION OF FORCES.

The railroad companies and the telegraph company are today facing the problem of paying dividends, of making both ends meet, and are threatened in some quarters with government ownership. There is competition on all sides among the railroad companies and the telegraph company likewise has to compete for business at all important points. Competitors are working continuously to improve their service by providing better apparatus, by a more reliable wire plant, by more efficient operation and by every means, while the public, influenced by political agitators, has an insatiable appetite for perfection in all things and particularly, it seems to us, for instantaneous and never-failing wire service.

The superintendents of telegraph have charge of the forces who do the construction, reconstruction and maintenance work over a large part of the telegraph company's plant and the telegraph company is dependent on them to a large extent for the proper expenditure of the money for this class of work. Therefore, the responsibility for improving general conditions of the wire plant falls heavily on the superintendents of telegraph. The telegraph company wishes to render all assistance possible in this work and it is continually seeking to improve its plant by providing better methods, higher standards in materials and in every other way practicable. In general the specifications for line materials provide for materials of a higher grade than even before and fully up to the standards set by the best wire companies. The contracts between the companies place certain obligations on each company and some of the duties of the superintendent of telegraph are specified, but there is no formula which he can follow in his daily work that will enable him to surround himself with an able corps of assistants and do other things that are essential in order for him to make a success of the job.

In this paper are outlined only a few of the things that should be done when restoring lines damaged by storms, for which is expended each year a large sum of money, an amount, however, which is only a small percentage of that spent on construction, reconstruction and maintenance work, and so this paper covers only a small part of the general subject.

It is the business of the superintendents to exercise their individual initiative to find and develop high class workmen, to give authority to subordinates who can use it in getting results and to supervise their work. Perhaps one of the mistakes that is most frequently made, particularly in the case of emergency work in storm repairs, is the failure to give full authority to subordinates who can use it in getting results and to supervise their work. Perhaps one of the mistakes that is most frequently made, particularly in the case of emergency work in storm repairs, is the failure to give full authority to a subordinate, such as a general foreman. There is nothing that is more harmful to the organization or that affects its efficiency as quickly as this does. It is of the greatest importance that the responsibility for doing any piece of work shall be definitely assigned to someone fully competent to do it and it is equally important that every one concerned shall know on whom the authority rests. In any sort of emergency work there is always a tendency to take short cuts and deal direct with the lowest man on the job and it is second nature for some superintendents to give orders to gang foremen or linemen without recognizing the general foreman or head of the unit organization. Such work will do more to disrupt and destroy an organization than almost anything that could be done, for when a man at the head of an organization is not the real boss, every one knows it at once. Therefore, select men who have the natural ability to command and support them in every way possible by turning the job over completely to them, sending all instructions to them and by compelling all subordinates to recognize these men in their dealings with their forces. Any mistake of this kind is more noticeable in emergency work than in ordinary work because so many persons are looking for the expected results which are not obtained, but the inefficiency is just as great in one class of work as the other even if it is not as apparent. We have only to examine the organization of our fire departments, or police forces doing riot duty, and of others whose business it is to act in emergencies, to see the necessity for a strong central authority to handle our emergency work.

The several railroad companies and the telegraph company have in their employ continuously a large number of linemen, gangs, wire chiefs, general foremen, district foremen and supervisors, whose business it is to construct and maintain the lines and to repair them after storm breaks. They provide large stocks of cable, wire, poles and other material and promptly appropriate money to do any work that is required. The companies therefore have all materials and an adequate corps of men for this work that is so necessary for their continued success. It only remains for the superintendents of telegraph and other officials to provide the necessary brains and the stimulus to their subordinates and I believe that by giving the matter serious thought and by adopting new methods of systematizing the business and giving greater attention to competent supervision, a degree of efficiency which in this progressive age is demanded of all public service corporations will be reached.

Straits Settlements Service

The telegraph lines of the Straits Settlements are owned by the government. There were forwarded during the year 244,301 telegrams, which were 16,000 more than in 1911. The revenue received was $27,256, expenditures $26,178, a very small amount of which was expended in extensions.

The Colonial government owns the telephone system in Penang and Malacca, where 495 and 57 telephones, respectively, were in operation at the close of the year. The profit on this account was $10,834. A special vote of $27,250 was approved for metallic circuiting the exchange, to avoid induction from the cables of the Electric Lighting Company and remodeling the police lines, which are nearly all old and no longer serviceable.

The department expenditure during the year was $270,194. The balance of revenue over expenditure, after deducting $50,060 classified under revenue stamp, was $117,902.

The German government has lately proposed to the government of Sweden to lay a telephone cable from the German coast, at Sassnitz or Arcona or to the north of Zingst, to Trelleborg, in Sweden. The cable will be connected with the German telephone network and new landlines will afford direct connection with Berlin and Hamburg.

Finances of Government Ownership

The Second of a Series of Three Articles on State Operation of Wire Utilities

BY PAUL H. WOODRUFF

LAST March we presented to our readers a compilation of opinions on government ownership and operation of telephone and telegraph lines. We selected these quotations carefully, with due consideration for the fame of their originators; but of course they were only opinions. This month we give a few actual figures tending to show that government owned wire systems are universally unprofitable to their operators—we will easily be able to show later that they are quite unprofitable to their patrons.

It is a stock argument of government ownership protagonists that a government operated utility *should not* show a profit; the idea being that it is operated by the people for the people, and that the people consequently pay just enough to cover expenses.

In practice, however, there are two conditions which render this theory positively inoperative. The first is that no utility, and certainly no government operated utility, can be so conducted that its rates exactly balance its expenses, without profit or deficit; and the second is that the users of a government system invariably insist upon—and obtain—rates relatively so low that a large deficit is inevitable. Furthermore, the operating expenses of a government owned utility are always enough greater than the operating expenses of a privately owned utility to turn what would be a private profit into a government deficit; so that the "relatively low" rates may actually be higher than under private operation.

As to the deficit—a condition perennially revealed in government operated utility reports—it has even been argued that such a condition is unobjectionable. Some have gone so far as to maintain that a deficit is desirable, since it is in effect a visible proof and guarantee that rates are low—even lower than they should be; which condition is supposed to foster contentment among the people.

The veriest tyro in economics will see, however, that this theory is absurdly untenable. A deficit, in the first place, is more apt to show inefficient management than it is to show too low rates; and where the rates are low, they are so because the non-user is making up the shortage of the user. There is no other way to make up a deficit but through taxation; and that means that the non-user, who presumably is so because he cannot afford to be a user, arbitrarily must help the user pay for service for which he is amply able to pay without help.

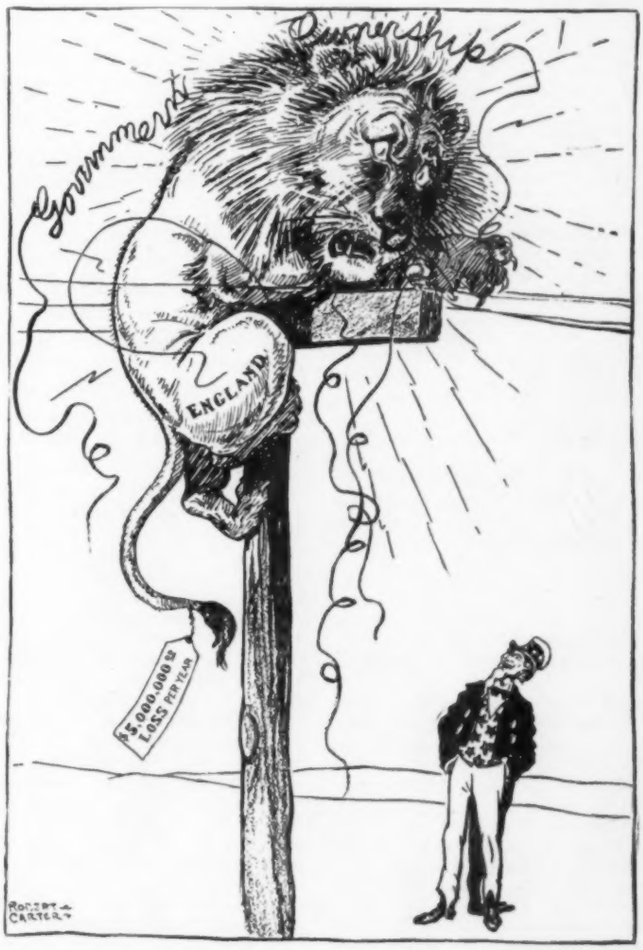
When a private company shows a deficit, it comes out of the pockets of its stockholders, who invested their money in it on the usual business chance of profit or loss. When a government owned utility shows a deficit, it comes out of the pockets of those who have no interest in it and can least afford to pay for it. In the extreme development of this condition, the poor are taxed for the benefit of the affluent.

We have said that government owned wire systems are universally unprofitable to their operators. We know, however, of one exception. It is the telegraph line operated by the United States which we mentioned editorially in our March number. Concerning this we quote again from John J. Underwood:

> Mile for mile, the government charges at least 280 per cent more for service in Alaska than does either of the large companies operating in the United States. . . . The government has profited, but at a terrific cost to the people who have used the service.

In short, here is a case where the government, our government, has a monopoly, and is behaving like any other monopoly. It is getting away with the "take it or leave it" principle and making money on the proposition like one of the proverbially arrogant trusts. Being government, it is not subject to commission regulation or the doctrine of reasonable return on investment.

But other governments have been less fortunate in their imitations of the soulless corporation. To prove that we are moved to introduce here some evidence which really should go in the last article of this series—"Facts About Government Ownershp." But knowing that we will have enough facts without this, we introduce Mr. Otto de Fejer, counselor secretaire of the Royal Hungarian Post and Telegraph Administration, quoting from his statement to the New York Telephone Company's representative:



Uncle Sam—"They Won't Get Me."
—New York World.

A comparison with our own country is impossible. Your service is the best in the world. It is much more difficult under government ownership, for very many reasons.

The dignity of the government will not allow it to send out canvassers to solicit business. It cannot approach prospective subscribers and induce them to take a telephone. It must wait until the business comes to it. For this reason it is impossible for a government to estimate the future growth of telephones as well as a privately owned corporation can. A private corporation is a business concern, and the government is not. All it can do is to base its plant upon experience and official city reports of new building developments. This attitude of a government in not canvassing for business makes impossible the intimate study of telephone development that is made in America. It is only when the telephone facilities that have been provided for a new territory have been used up that it is possible to apply for a government appropriation for additional facilities. These applications have to pass through the hands of several government departments and finally reach Parliament, where it is debated, and the time when the money is granted is very uncertain. After the money has been appropriated, the new lines or new buildings that are required have to be constructed. In the meantime, the old central office is overloaded with traffic, and of course this interferes with the quality of the service which the operators can furnish.

Your exchange service we find most excellent everywhere. We were surprised to find such excellent equipment and service in Washington; they were more like what you have in New York than we expected.

In my opinion you have a very excellent and highly trained staff of operators and supervisors. Your schools for operators are a wonderful institution. Your central offices are excellently managed. Your supervisors are able to keep the force up to the highest efficiency, and by coming in on the line they are able to reduce the operators' loads when they are pressed. Then the chief operator is a very excellent thing also. Your supervision is perfect. Flash here and the operator asks immediately, "Number, please." If a line is busy, the operator will call up presently and make the connection. That is not usual in Europe, where the subscriber is obliged to make a new call.

Then there is the very great efficiency of your information offices. In our offices we also have a kind of information, but we give only the name of a subscriber, or the number of a station, and nothing else.

Your toll offices and your long distance offices also enable subscribers to get connections very promptly. I think it is because you have a lot of wires that are always available.

I find also your operating rules bring everything to the simplest terms and meet every question that the subscriber can ask, and the operator does not have to stop and think what she should say.

Last, but not least, is the great facility you have for dismissing an employe for inefficiency. This is very different with us. In a government system inefficiency alone is not considered a cause for dismissal, and it is impossible to discharge an employe except for some very serious offense.

Especially, however, is your efficiency due to your very excellent operating staff.

Your observation service also is splendidly conducted. We observe service to some extent, but we do not carry it as far as you do, nor do we make use of the information to correct faults and improve the service, so that it is of little value to us in comparison.

Your traffic department as a whole is a most highly developed and efficient organization. Your traffic and plant and commercial departments all co-operate not only within themselves but with each other. That is what you call team work. It exists between different departments and in each department. I must emphasize "team work."

We do not have a traffic department in the meaning of your traffic department. The service which we give is not your service.

We have no standard like you have: if an operator makes a connection without too much delay, we consider it satisfactory.

We have small operators' schools, but we do not give the same course of instruction that you do. We expect to install a new operators' school and are going to copy your schools here.

The rates of pay with us are not so high, but a dollar with us is worth more than in America.

We have flat rates only. We make no difference between business rates and residence rates, but we intend to adopt your message rate system. A flat rate is an average rate, which makes a small user pay too much, and the large user does not pay enough; that is why the telephone is so expensive with us and more expensive than in your country, where you have the message rate.

You must consider the real value of money in our country and in yours. A flat rate of 300 crowns, which is about $60 in American money, may seem low, but on the basis of the real value of money, that is, its buying power, you can see that it is very costly. The buying power of $60 in our country would be equal to at least $150 in America. So you can say $150 a year for flat rate service in a town of 30,000 inhabitants is high. Places are crowded with people who want to telephone. All the neighbors and their friends come to use the telephone of a man who has enough money to pay for it. This also makes a very high calling rate per station. This forces the government to introduce the message rate system so as to make the telephone available for small users as well as large. Our people consequently are not very well educated in the use of the telephone.

In all European countries the cost is not comparable with the United States on the basis of the number of dollars charged, but on the basis of the value of the dollars.

Our flat rates are for districts. In the same district the rates are cheaper in proportion than our toll and long distance rates.

The service between New York and Chicago is very fine. We have no such long lines in our country. Our longest line is from Budapest to Berlin, a distance of about 700 miles.

You can speak with the same transmission efficiency much further than we can. You have better operators and switchboards and everything. The quality of your operators and your apparatus is better than ours.

We have plenty of money, but it is harder for us to get an appropriation from the government for improvements than it is for you to raise money in America.

Your public telephones are very interesting, especially those in restaurants. Telephones are everywhere. Such a thing is impossible in Europe, because our people are not accustomed to it as you are here. You seem to have a telephone on every corner; everybody uses the telephone.

In Budapest, with a population of about a million, we have had in one central office 18,000 lines serving about 26,000 stations. About four years ago this central office became overloaded and application was made for an appropriation to construct and equip a second exchange. In November, 1912, a temporary relief was afforded by the construction of a small exchange accommodating 4,000 lines, and during the coming summer the new exchange will be cut into service with 15,000 lines. This will make Budapest the only city in Hungary which has two exchanges.

To get down to actual figures, the following summary of Great Britain's experience with the telegraph from the financial standpoint, published in the London *Spectator* early in 1912, is interesting. The condition mentioned existed, of course, before the acquisition of the National Telephone Company's system by the British government:

Forty-five years ago, in 1866, the proposal for the purchase by the government of the British telegraph lines was first advanced, and an allegedly conservative estimate set the cost at $11,500,000. It took nearly three years to complete the negotiations, and in 1869 Parliament appropriated $35,000,000 for making the purchase—nearly three times the original estimate; but in addition to that the government was called upon to pay the railway companies for their freehold interest in the telegraph equipment running along their lines, the right of way having been only leased by the telegraph companies; that meant another $20,000,000—so the acquisition of the business stood the British government $55,000,000. It was still predicted that within twenty years the net revenues would materially reduce the tax rates on the properties of the people. The disillusionment came quickly. For the first two years of the government operation there was a small net revenue, but after that the returns could not be made to meet the interest on the capital investment, and for thirty-nine years this enormous interest has been paid out of the exchequer—the pockets of the people. Then telegraph rates were reduced under the popular cry that reduced rates would increase the business and that increase would produce profits—but just the reverse was the result. The cost of maintenance and operation increased enormously under government ownership; and the revenues falling far below this and the upkeep and necessary improvements constantly calling for more money, the drain on the exchequer became increasingly heavy.

When all these facts are taken into account—namely, the original capital which has never been repaid, the advances from Parliament upon which no interest is charged; and the annual deficiencies on working expenses—it will be found that the aggregate commercial loss to the country by the state purchase of the telegraphs is not less than $175,000,000. Nor can we console ourselves with the reflection that for this $175,000,000 the state has a valuable asset, for that asset, such as it is, involves every year on its working an additional loss of over $5,000,000. From a commercial point of view the purchase has been an unmitigated failure.

An extract from the Report of the British Postmaster-General for the year 1912-13 (page 34) reads as follows:

Telegraphs.—The telegraph revenue of the year, including the value of services rendered to other departments, was £3,167,410, an increase of £19,705; and the telegraph expenditure, including the interest on the capital—£10,867,644—expended on the purchase of the telegraphs, was £4,124,976, a decrease of £309,897 upon the previous year. The net deficit was thus £957,566, ($4,663,346.42) or £329,602 less than last year.

In the Report of the Parliamentary Committee of Public Accounts, Great Britain, 1910, Sir John Briggs, accountant general of the post office, says:

For telegraphs there has been no capital account since the purchase of the property of the Inland Telegraph Companies in the seventies. To establish a capital account for telegraphs would have involved the valuation of the assets of the undertaking at the present, and the Inter-departmental Committee on which I sat on which the treasury were represented . . . recommended, in the circumstances, that it was not worth to incur the huge expense of the valuation, and that for telegraphs we should dispense with a capital account. One reason why that was recommended was that we now have a loss of about one million (pounds sterling) a year, and it was not very encouraging.

When, the first week in 1913, a deputation from the town councils of Dundee, Aberdeen, Arbroath and Montrose, and Chambers of Commerce and other bodies in these towns, waited on the postmaster-general (Mr. H. Samuel) to urge upon him the necessity of extending the underground telegraph cables from Edinburgh to Dundee and Aberdeen, Mr. Samuel said the extension of the underground telegraph cables to Dundee and Aberdeen would involve a capital cost of £130,000, which would mean an annual charge for interest and sinking fund for 15 years of £11,287. The total gross telegraph revenue in Dundee and Aberdeen was £16,000 a year before deducting any expenses or charges. The deputation were asking for an annual expenditure of more than two-thirds of the gross revenue—he did not know that there was any net revenue—in order to avoid occasional delays. There was a loss in the telegraph system of the country of over £1,000,000 a year, and therefore one had to look carefully at any additional expenditure.

Accounts of the British telegraph service for the year ended March 31, 1913, and statements of account in respect of the telegraph and telephone services for that year, together with the report of the comptroller and auditor-general, give the following figures:

The gross amount received by the Post Office in respect of telegrams, telephone rentals and fees, private wire rentals, newspaper wire rentals, etc., during the year ended March 31, 1913, was £9,656,671. 2s. 5½d. (less £808,690. 9s. 7½d. paid to cable companies, foreign countries, etc., and £3,198. 9s. 5½d. telegram moneys refunded), gross amount received in respect of royalties payable by the National Telephone Company and other licencees was £1,658. 17s. 11d., and the value of telegraph and telephone services performed for the other public departments without remuneration was £106,670. The amount expended by the Post Office for salaries, superannuations, maintenance of the telegraph and telephone systems, etc., was £7,003,179. 19s. 6¼d., purchase of sites represented £17,399. 2s. 8d. and extensions £12,106. 18s. 3¾d., and after adding amount expended in respect of annuities payable to the commissioners for the reduction of the national debt in repayment of moneys advanced for development purposes (£981,697. 18s.), amount expended for interest and part repayment of capital in respect of the purchase of the National Telephone Company's plant, etc. (£1,000,000. 1s. 6d), amount expended by Office of Works in respect of erection (£55,815), and amount expended by other departments in respect of various services rendered (£260,759), leaving a balance of expenditure over receipts of £377,846. 18s. 8½d. The total net expenditure of capital out of the money raised by the creation of stock for telegraph purposes was £10,129,687.

Truly government operation of telegraphs has not been profitable to Great Britain. As W. S. Jevons, the noted English economist, once said in an essay on the British post office telegraphs:

The work done is indeed great and fairly accomplished on the whole, and some people regard the achievements of the department as marvelous. They forget, however, that it has been accomplished by the lavish and almost unlimited expenditure of the national money, and that many wonders might be done in the same way. If the English people like to spend their public revenue upon cheap telegrams, of course they can do so, though there may be two opinions about the wisdom of the expenditure. But in anv case, it is not wise for us to forget the extreme discrepancies between what was promised and what has been achieved by the telegraph department.

Telegraphs and telephones are state-owned in France. An article by M. Herman, comptroller of the Postal, Telegraph and Telephone Department of France, published in the *Bulletin de l'Association des Abonnés au Téléphone* (Paris, France), October, 1913, explains some of the difficulties attending the financing of a typical government wire system:

Unfortunately . . . we are not business men, we are the State. We cannot borrow, and our budget is merged into the general budget of the State. Consequently we must lead a hand to mouth existence. In contrast with a business man who would amortize the primary construction expenses over a certain number of years, all our expenditures are regulated from budget to budget. Thus, when we say, for instance, that our receipts exceed our expenditures by about 10 millions, that does not mean that we have earned only that much profit; it simply means that that is the difference between what we have received and what we have spent in salaries as well as for new installations.

We have been asked whether it would be possible to know exactly what the telephone yields and what it costs. Of course this can be done, and it is probably only a question of apportioning figures. You will say that business directors manage industries quite as complicated as that of the Postal, Telegraph and Telephone Department, and that not one of them would be satisfied if he did not know exactly the balance-sheet of each branch of his business. It seems, therefore, that it ought to be possible to separate the figures for the postal service, the telegraphs and the telephones. That is, as I said before, possible, and furthermore we have these statistics. But the results are so approximated that we do not want to consider them except as statistics. Think of the tremendous work which an exact apportionment would entail. For instance, take the buildings. The post office, the telegraphs and the telephones occupy them in common. Even during the course of a year the importance of one of these services may vary. Such and such a post office may find suddenly that it has a very important telephone exchange; how, and in what proportion, should the rate of rental charged to the telephone be altered? The postmaster himself, according to circumstances, may be principally busied with postal, or with telephone duties. How should his salary be charged? The telegraph and telephone lines pass through the same conduits and are attached to the same posts; I would say further, they use the same wires; how should the traffic, the wear, the upkeep of these lines be divided between them? Approximate figures are arrived at, but these figures cannot be taken as a sufficiently serious basis to state a positive result.

Moreover, this tremendous task of apportionment would lead to no practical results. We would obtain information in this way which we already have in part, but nothing would be changed, since our budget remains a part of the general budget, and we can do nothing but try to obtain a little more each year. Our budget of expenditures now amounts to 375,000,000 francs ($72,375,000).

This year, in order to give the telephone greater autonomy, it was proposed to create a special account, as exists already in the budgets of other services. This special account figured in our project of the budget and was adopted by the Chamber.

But in the shuttlecock and battledore proceedings between the Senate and the Chamber, preceding the closing of the discussion, the special account dropped out, and the appropriations contained in it were incorporated in the budget, after they had been greatly reduced. Our Minister, M. Massé, has, however, obtained an appreciable result for the current year, since our appropriations exceed those entered in the budget for 1912 by 33 million francs ($6,369,000).

The project of the budget for 1914 is now established, and the treasury has other, and more urgent, problems to solve, among others, the military expenditures. There cannot be any question at present of modifying our financial system. It is nevertheless regrettable that an industrial service cannot be carried on in a businesslike manner, all the more so since this result could be obtained without imposing any new burden on the general budget.

Another side-light on this subject is contained in the Official Report on the General Budget for 1913 (Posts and Telegraphs) by Senator Emile Dupont, page 286:

If the appropriations originally asked for (for the construction of new telephone lines), are insufficient, the local superintendent makes the fact known, and they must be increased, or the work left unfinished. But in case the estimates were too high and the superintendent has received a larger appropriation than was necessary, what happens? Will he admit his mistake? Would it not be more human to try to conceal it?

Can the Administration deny that certain departments have gone ahead with constructions whose utility and necessity were disputable, for the sole purpose of utilizing funds which were at their disposal because of excessive estimates? These regrettable irregularities are not practiced exclusively by the Postal Administration; they are unfortunately too frequent in all public services.

And in the Report of the Commission of Finance, charged with examining the law adopted by the Chamber of Deputies concerning the general budget, 1911, the same gentleman had this to say:

The consequence is that, taking everything into account, the operation of the telegraphs results in a deficit. . . . In his Supplementary Report on the Budget for Posts and Telegraphs for 1905, Hon. M. Sembat tried to draw up a balance sheet for the three great branches of the service. With definite reservations, he indicates a deficit of 9,777,000 fr. ($1,886,961) for the telegraphs.

But of course the telephone condition of France is notoriously bad. Yet the British postmaster-general not long ago pointed with pride to the fact that London service was "already as good as that of Paris!"

New Zealand is frequently mentioned as an example to aspiring governments. Here are the financial results of the combined telegraph and telephone toll service in New Zealand, 1907-08 to 1911-12, inclusive, as published in the Official Reports. (Telephone toll service, in New Zealand, is operated in conjunction with the telegraph service.) The net results, shown below, are exclusive of interest charges which, if taken into account, would materially increase the deficits shown:

Year Ended March 31	Gross Telegraph and Telephone Toll Revenue (incl. Miscellaneous Revenue) £	Value of Government Messages £	Total Value of Telegraph and Telephone Toll Business £
1908	227,398	4,499	231,897
1909	238,104	4,821	242,925
1910	250,212	4,851	255,063
1911	272,943	4,874	277,817
1912	295,334	4,832	300,166
Totals	1,283,991	23,877	1,307,868

Total Telegraph and Telephone Toll Expenditure (excluding interest charges) £	Official Net Profit (excluding interest charges) of the Combined Telegraph and Telephone Toll Services £	$
275,757	— 43,860	— 213,160
307,166	— 64,241	— 312,211
322,485	— 67,422	— 327,671
344,046	— 66,229	— 321,873
364,613	— 64,447	— 313,212
1,614,067	—306,199	—1,488,127

And for the year ended March 31, 1913, as published in the Official Report of the Post and Telegraph Department of New Zealand:

	£	$
Gross Telegraph and Telephone Toll Revenue (including Miscellaneous Revenue)	321,951	1,564,682
Value of Government Messages	4,931	23,965
Total Value of Telegraph and Telephone Toll Business	326,882	1,588,647
Total Telegraph and Telephone Toll Expenditure (excluding interest charges)	388,464	1,887,935
Official Net Profit (excluding interest charges) of the Combined Telegraph and Telephone Toll Services	—61,582	—299,288

Representative Dr. Paasche, in the course of a speech in the German Reichstag, February 15, 1901, made the following statement, as given in the *Archiv für Post und Telegraphie* (an official publication), for April, 1901:

In accordance with information furnished by the secretary of state of the Imperial Post Office, an attempt has been made to estimate the financial result of some branches of the Postal Administration, by applying ordinary commercial principles. Using correct rates for depreciation, and a proper interest upon the capital invested in the telegraph, it appears that this service requires annually a contribution of 15,000,000 marks, being, therefore, a losing business.

That conditions in Germany have not improved in this respect seems to be indicated by an exceedingly brief but pregnant comment by Herr Kraetke, postmaster-general, Imperial Postal Service (including telegraph and telephone service). The statement was made in the course of a debate in the German Reichstag on March 27, 1912, and was published in the *Deutsche Verkehrs-Zeitung*, which is the official organ, April 5, 1912:

The gentlemen know that the Telegraph Administration is run at a very heavy loss.

Australia, also, has battled long with the distressing problems of state wire finances. The Report of the Royal Commission on Postal Service, Australia, dated September 30, 1910, gives some idea of the trouble:

Accepting the most liberal reading . . . the estimated loss on the transaction of the Department from the inception of the Commonwealth to June 30, 1909, amounted to at least £2,300,000. . . .

The information furnished would make it appear certain that the postal section of the Department returns a profit as a whole, but the extent of such profit was not ascertainable. . . .

Your Commissioners therefore conclude that the Department's unsound financial position is due to the fact that telegraphic and telephonic services are rendered at rates which do not return revenue sufficient to cover all charges against capital account, and working expenses. . . .

Consequently the postal section of the Department has to assist in carrying the financial burden of the telegraph and telephone sections. This is distinctly inequitable, and the result is that the mail facilities to outlying districts suffer curtailment, while telegraphic and telephonic facilities are furnished at a loss. . . .

Your Commissioners endeavored to obtain the above mentioned information with the object of definitely establishing which were paying and which were non-paying branches of the Department, and of showing the relative extent to which they were paying or non-paying. The Accountant in New South Wales estimated the cost of earning £1 of revenue to be as follows:

Postal Service	£0	14	10
Telegraph Service	1	9	6
Telephone Service	1	5	0

The only other information on this subject was supplied by the South Australian representative of the commonwealth auditor-general, who had for many years been associated with the accounts branch in New South Wales. This witness' estimate of the cost of obtaining £1 of revenue in South Australia was as follows:

Postal Service	£0	15	10
Telegraph Service	1	1	5
Telephone Service	1	3	2

In addition to the figures quoted, the chief electrical engineer stated that to obtain £1 of revenue from the telephone service involved an expenditure of £1 7s., exclusive of sinking fund.

South Africa's experience is set forth briefly but

comprehensively in these extracts from the Report of the Postmaster-General of the Union of South Africa. For the year 1910 it shows:

Although every effort has been made to reduce expenditure, there is little prospect of the Telegraph Department paying its way. The reports of all the provinces prior to union showed losses in working, the amount in the Cape Colony and Transvaal being at the rate of £37,000 and £34,052 per annum respectively. . . .

The general position of the telephone account of the Union for the calendar year 1910 was:

Capital expenditure	£893,239
Revenue, 1910	167,271
Expenditure, 1910, including interest and depreciation	189,049
Deficit	21,778

The Official Report for the year 1911 (page 12) says:

After debiting the telegraph account with all direct charges incurred and a proportionate share of the cost of administration and other general expenditure, and, on the credit side, including the value of work undertaken free of charge for other government departments and of the concession represented by the reduced rates to the railway, it is found that the working of the telegraphs of the Union resulted in a deficit for the year of over £60,000.

And for 1911:

Total receipts	Fr. 8,271,900 ($1,654,380)
Total expenses	Fr. 9,530,588 ($1,906,118)
Deficit	Fr. 1,258,688 ($ 251,738)

The Annual Report on the Postal, Telegraph and Telephone Service of The Netherlands for the Year 1910 shows no exception to the general rule. Similar reports show that the telegraph service in The Netherlands has produced a deficit each year since 1865:

Total telegraph revenue	Fl. 2,543,679 ($1,017,472)
Total telegraph expenditure	Fl. 4,180,227 ($1,672,091)
Deficit	Fl. 1,636,548 ($ 654,619)

Statistics for 1911 for the state telegraphs of Spain are as follows:

Total receipts	Fr. 10,622,159 ($2,124,432)
Total expenses	Fr. 12,153,718 ($2,430,743)
Deficit	Fr. 1,531,559 ($ 306,311)

The Official Report of the Minister of Public Instruction, Post and Telegraphs, Ecuador, for the year 1911-1912, page 26, gives the following information:

To be perfectly candid, I can do no less than state in this report, that the accounting of the telegraph branch still suffers from "routine-ism" and really woeful inefficiency. And without proper accounting, it is difficult to exercise any control, or to make just criticism. The result is, that in a service whose income should suffice to meet its needs and to yield an assured profit to the exchequer, there occurs, year after year, a greater and greater deficit, as can be proved by simply making a comparative analysis of figures and dates.

Limiting myself to the year with which this report is concerned, the financial standing of the telegraphs for the last six months of 1911 was, approximately, as follows:

Receipts	S1. 169.586,62 ($ 82,588.68)
Expenditures	S1. 230.486,17 ($112,246.76)
Deficit	S1. 60,899,55 ($ 29,658.08)

In the first six months of this year the revenue and expenditures were as follows:

Receipts	S1. 139.804,63 ($ 68,084.85)
Expenditures	S1. 221.650,28 ($107,943.68)
Deficit	S1. 81.845,65 ($ 39,358.83)

On January 1, 1908, the province of Manitoba, Canada, purchased the privately owned telephone system and began operating it under a telephone commission. The Honorable R. P. Roblin, premier, and Attorney-General C. H. Campbell had promised better service at half the cost. Here are the actual results:

March 1, 1908—Rates in Winnipeg for certain classes of service were increased 25 per cent.

February, 1909—Inferior party line service was introduced and a slight rate reduction made.

March, 1910—Chairman of the Telephone Commission declared the rural rates inadequate.

May, 1911—Many long distance rates doubled and time limit generally decreased from 3 to 2 minutes.

November, 1911—Chairman of Telephone Commission reported a loss for the year of $150,000, without making any provision for depreciation.

December, 1911—Announcement of increase in rates aroused a storm of protest.

March, 1912—Citizens' Committee of Winnipeg made an investigation, and reported that the proposed increase was inequitable.

June, 1912—Public distrust of the Telephone Commission and suspicions of graft forced the appointment of a Royal Commission, which condemned the proposed increases on the ground that "the system has generally been administered extravagantly and that a very large saving could be made by economical management." Telephone Commission resigned.

July, 1912—Increases of 20 per cent in rates for business and residences were announced, establishing a higher schedule than that of the Bell Company before purchase by the government.

Commenting on the situation, the *Montreal Gazette* said: "Some of the advocates of public ownership seem to have thought that having gotten the government to take over the service, it would be easy to get cheap telephones by putting a part of the cost on the general taxpayers. It is not well to put the cost of a personal service or some of the people upon all the people."

The advocates of government ownership in their comparisons of European government-owned systems with those under private management fail to mention the absence of taxation in the case of the government system, and of course the question of the quality of the service is treated as entirely irrelevant. As shown by figures taken from official records, the average earnings per station, here and abroad, are not materially different:

	Average of 7 State Owned Systems in Europe	Companies in United States
Total annual earnings per station, toll and exchange	$36.89	$40.14
Earnings per station, exchange service only	26.78	30.93

Deduct taxes and make allowance for the differences in the purchasing power of money here and in Europe and it will be found that rates in the United States are actually lower. The government pays no taxes, even on its real estate.

This article intends to deal only with the finances of state-owned wire systems, and no attempt has been made to show the universal inefficiency of government wire service. That subject is reserved for the third article of the series, to be printed in an early number. What we have tried to bring out, with all the records of history to aid us, is the obvious impossibility of making a government wire system pay its own keep. The reasons for that impossibility may be economic, or political, or purely psychological; but that they are real the records show. It cannot be done. And the result is that the taxpayer pays the deficit. The humble citizen who is too poor to use service at all, nevertheless is forced to pay for it without even the chance to use it after he has paid. He has no recourse. His part of the bill for telephone and telegraph service that he never had—his part of the deficit—comes to him insidiously and deceptively disguised as higher rents, higher market prices, higher everything. If he refuse payment he may starve, or wear shoddy clothing, or be dispossessed of his home.

Government ownership of utilities in theory is socialistic. In practice and in truth it is monopolistic and autocratic to the highest degree of oppression.

Pennsylvania Independents to Get Together

A conference of the members of the Western Pennsylvania Independent Telephone Association was held on May 7 and 8 at Johnstown. The linking of the independent telephone lines of the state and improving connections with those in other states, was the chief subject considered.

Co-operation was the keynote of the meeting. All the delegates agreed upon the point that in order to successfully compete for business against the bigger systems it was necessary to work in harmony for the establishing of a perfect transmission line for toll work.

One speaker declared that he knew of an instance where one independent company was operating within five miles of the other, yet neither knew the other existed.

It was pointed out that many strong telephone concerns with perfect local systems make up the two associations of Pennsylvania and the assocations of the surrounding states, and that if every company concerned puts forth an effort to perfect the connecting links a perfect toll or long distance line would be established.

New legislation was debated to considerable extent. One speaker declared that the ruling of the public utilities commission which requires all public corporations to file and standardize their rates would make some contracts obsolete. The speaker said that in some instances the telephone companies were charging a rate lower than in others. The commission required them to increase their rates to come up to the standard. The contracts made by the telephone company under lower rates, he declared, thereby became obsolete.

A uniform time scale was also talked of. It was pointed out that the eastern companies had a measured service of five minutes, while the companies in the west limit this to three minutes. Persons talking from Harrisburg may talk to Williamsport for five minutes for a certain charge, but must pay the same rate for three minutes to Johnstown. This flaw will have to be eliminated, it was declared, and either the three-minute or the five-minute rate adopted by the entire state.

Telephone Use in Train Dispatching

The telephone is rapidly supplanting or taking the place of the telegraph instrument in railroad work. That is the statement of men connected with all railroads.

However, the telegraph is not going entirely out of use by the railroads. Instruments with competent operators are still maintained in all the principal offices in most railroad offices and depots, in fact. But in these same offices telephones have been installed, and where the telegraph instrument is brought into use one time, the telephone is in service a score of times.

Time was when all train orders were given by telegraph. Now ninety per cent of them are given by telephone, by the train dispatcher direct, and as he is writing the orders. Very much the same rule applies to all railroads of any considerable importance.

It was about ten years ago that the Illinois Central first took on the idea of using the telephone for train dispatching. It was given a rigid trial and was found to answer all requirements. Now the entire line of that company, with the exception of a few branch lines, is equipped with telephone, so that a dispatcher on any division can reach any office in his division on a moment's notice.

The Illinois Central, like other railroad lines, has a private system; a system entirely independent of the Bell or any other company, though in most instances they have arrangements by which they may be connected with the lines doing general business. However, railroad officials can use their line without interference from any outside persons.

Railroad men explain that the telephone is an advantage over the telegraph for the dispatcher in handling trains, in addition to giving his orders can emphasize what he wants done a train to hurry along, to take on less cars, and various other things, at the same time having instantly repeated back to him, by the operator at the other end, the orders he has given so that there will be no chance of error in transmission.

In addition to furnishing a means for the management of trains by the dispatchers, the telephone furnishes an easy, instantaneous and accurate method of communication between the various offices having intimate relations, to straighten out shipments, charges, etc.

A prominent railroad man, talking of the new order of things, said:

"We would not know how to get along without the telephone now. It has made the handling of trains so much easier; it has reduced the possibility of accident; it has done so many things for us, that we could not now think of getting along without it. Of course, we don't expect to do away with or get along without the telegraph, but the telephone is the thing on which we are now relying to do our hurry work, especially in short distances, in a single division."

Removing Central Union Offices

Work on the complete removal of the state offices of Central Union Telephone Company from Chicago to Springfield, Ill., is nearly completed.

Following the election of former Commercial Superintendent C. H. Rottger to the office of general manager some time ago the exodus from Chicago started, Traffic Superintendent T. M. Bradford and Plant Superintendent H. B. Lewis, with their forces, having moved into the Reisch building, sixth floor, April 1.

May 1 F. R. Atwood, state engineer, moved his force from Chicago and settled in the same building. General Superintendent Rottger, who has been located on the second floor of the Central Union building, also changed offices to the Reisch building to make place for district accountant of the state, William Edger of Chicago, who will from now on occupy the entire second floor of the C. U. Telephone building. By June 1 his entire force will locate in the local telephone building.

Local Manager E. R. Cogswell will retain offices in the telephone building, where all local business will be transacted.

Indiana Convention Next September

The annual convention of the Indiana Independent Telephone Associaition will be held September 16 and 17, at the Claypool Hotel, Indianapolis. A complete announcement of the program will be made later. Exhibitors should communicate with the Claypool Hotel management at once to procure reservations for exhibits. There will undoubtedly be a large attendance, as matters of great importance to the independent telephone interests will come before this meeting.

The Telephone Scrap Book

Curious and Useful Items, More or Less Telephonic, Gathered from Everywhere

"Phonograms"

HERE is a sample of the "Phonogram," with explanations as to how it should be used, writes W. S. Clay, general manager of the Hutchinson (Kansas) Telephone Company. It is designed to take the place of either letters or telephone messages in certain cases where neither one just fills the need. For instance, if I want to remember my sister in California on her birthday or at Christmas time with a greeting, I would send her a phonogram instead of a picture postal or trying to use the long distance. First because the postal did not have the really personal element which it perhaps once did, and second, the cost of a telephone message would be prohibitive in this case. The phonogram is sent to the telephone company in the town where she resides and on Christmas morning, we will say, one of the pleasant voiced operators which we find in all exchanges will call up my sister and give her my message, thus adding a personal touch which could be obtained in no other way short of an actual message. The operator then makes a note of my sister's remarks if any, and after writing them on the return part of the phonogram they are mailed to me, thus apprising me of the fact that the telephone company actually delivered the message, and the result.

My idea was to have telephone companies only handle the sale of these cards, charging ten or fifteen cents each for them as the case may be, and by refusing to honor them from any other source keep the revenues in our own tills. It has been suggested by a telephone man from Kansas who has written me about them that we copyright a signature for them so as to prevent unauthorized persons from sending them to telephone companies for transmission and fraudulently signing some telephone company's name, thus cheating us out of the sale. I think this is a good idea, as it is the only way we could protect ourselves, as the phonograms themselves are neither patentable nor subject to copyright. My idea was to have each company making a sale keep the proceeds and have each receiving company transmit them for nothing, getting their pay from sales over their own counters.

MAILING CARD

PLACE ONE CENT STAMP HERE

RETURN TO

MAILING CARD

PLACE ONE CENT STAMP HERE

PHONOGRAM

PLACE ONE CENT STAMP HERE

TELEPHONE CO.,

Please have one of your operators call up

Tel. No.

and deliver the following message over the phone, telling party that message is from

Delivery of message to be made

In case party has no telephone please fill out opposite side of card below and mail locally, filling out said information also on the return part of this card.

Sent by Co.

Message to be delivered:

Signed

RETURN PART

Remarks of party to whom message is delivered, if any:

Message was delivered to party at o'clock

m. on Operator

Front and Rear Views of the "Phonogram."

One of the first ones I used I sent to the Tri-State Company at Minneapolis for transmission to a man from whom it was almost impossible to get a reply by mail to any business proposition and as it was regarding the sale of a house, I wanted to have more evidence than a telephone message would give me. I used the phonogram and got a reply back the next mail authorizing me to sell. All the man had to do was to talk and he told the operator what he would do and the result was a sale with evidence to back the order.

A man's wife could drop him one of these phonograms giving him orders to water the plants or feed the cat while she was away, and as he would get the news while in his own home he would obey orders where if he got a postal card he would forget before he got home from the post-office. If his wife told the operator to call him up some night at nine o'clock and then had to report that he did not answer the telephone, his tale of how he was home every night at eight during her absence would not go down.

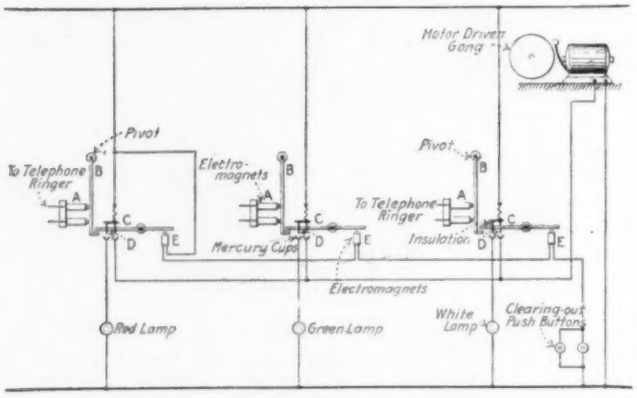
But all levity aside, the phonogram will find a place in the affairs of men, as it will take the place of written letters without depriving the government of any revenue and will be available to use in many places where the lapse of a few days time will not matter. Also the party sending it will get evidence of the delivery of the message and the telephone companies will make a good many dollars without tying up their long distance lines by so doing. Many a message will be delivered to waiting ones which does not now get across simply because it is easier to hatch a good resolve than it is to write the letter afterwards.

I would like to hear from

some more of my brother managers as to the advisability of trying to institute a phonogram service on the side, so to speak, for the revenue and the convenience it would make.

Unit Call System for Several Telephones

A. L. PLATT, engineer of the main generating station of the Canton (Ohio) Electric Company, states in the *Electrical World* that he has recently done away with all separate bell-ringing outfits for the three telephones in the station and has installed an original system, the circuit diagram of which is shown in the accompanying illustration. From the ringers of the three telephones in the plant, the Bell, the Stark and the private lines, conductors are led respectively to the three sets of electromagnets marked *A*. When the ringing current from an incoming call energizes one of these sets of magnets, the lever *B* swings toward the pole-pieces, allowing the pivoted horizontal lever *C* to fall by its own weight and immersing the small contact points *D* in the mercury contained in the cups beneath. This completes the circuit through the colored lamp corresponding to the ringing telephone and also energizes the motor-driven gong. Both the lamps and the gongs continue in operation until one of the push-buttons shown at the right of the illustration is operated by the person answering the telephone. Sets of these push-buttons, connected in multiple, are situated both in the booth containing the three telephones and in the office of the chief engineer. Actuation of the push-buttons, as will be seen by tracing the circuit, energizes the electromagnets *E*, returning the pivoted lever *C* to its original position. These magnets are wired in series, no provision having been made for selective operation.



Connections for Hood-Ringing Telephone.

Decides Telephone Is Necessary

That a telephone is absolutely essential to an adequate service by an express company is the opinion of the New Jersey Public Utility Commission, which has ordered the Wells-Fargo Express Company to install a telephone in its office at Allendale.

The complaint made by citizens of Allendale was that the company had no telephone and would not make deliveries in the town. The Utility Board thought that it would be unfair to make the concern put in a delivery service, but that a telephone was absolutely essential.

Locking Device for Telephone.

A SIMPLE and inexpensive means of preventing unauthorized persons from using a telephone is shown, in the form of a collar for the stand and a padlock and a link to hold the receiver hook down. In this position the talking circuit is open and cannot be closed except by some one who has a key to the lock. A correspondent of *Popular Electricity* is responsible for the suggestion and illustration. The device should prove a boon to measured service subscribers who have been annoyed by excess calls ascribable to the surreptitious use of the instrument by servants and other unauthorized persons.

Switch-Hook Lock.

Compulsory Connection Legal in Oregon

The United States District Court for the district of Oregon has recently ruled that physical connection between two or more competing telephone lines and an exchange of service can be ordered by the state commission.

This decision was rendered in denial of an application for an interlocutory injunction, pressed by the Pacific Telephone & Telegraph Company against the Wright-Dickinson Hotel Company, the railroad commission of Oregon, the Home Telephone Company and the Benson Hotel Company, No. 6248; Gilbert, circuit judge, and Wolverton and Bean, district judges.

The proceedings in the federal court were the outgrowth of the order entered by the state board in the case of Wright-Dickinson Hotel Company *et al.* vs. Pacific Telephone & Telegraph Company *et al.*, *U.F-22*. For several years prior to January 29, 1913, the Wright-Dickinson Hotel Company operated the Oregon Hotel at Portland. The Pacific Company maintained an equipment in said building and afforded adequate service, locally and long distance, to the patrons thereof. Later S. Benson constructed a hotel adjoining the Oregon, and service in this building was furnished by the Home Telephone Company. The management of the Benson Hotel was taken over by the Wright-Dickinson corporation and thereupon the Pacific Company discontinued its service to the old building, selling its wiring and system therein to the Home Company. It also established a limited service in the hotel buildings, placing telephones in the hallways and other semi-public places, including booths in the lobby. In March, 1913, application was made to the commission for a connection between the Home and Pacific systems so that they might be used interchangeably by guests at the hotel. This was ordered, with the expense of connection placed on the hotel company and of maintenance on the telephone companies. The commission also allowed the Pacific Company a toll of 3 1/3 cents for each call going out of the hotel and transferred from the Home switchboard to that of the Pacific Company, in addition to sums accruing under the existing contract between the Pacific and the hotel companies for private branch exchange service. Since the proceedings in court were inaugurated the new hotel has been surrendered to the Benson Hotel Company, but there has been no change in the telephone facilities, excepting that a connection has been made between the switchboards by the Wright-Dickinson Company and the Home Company under order of the commission.

Increasing Long Distance Business

Methods Advocated by the Service Department of Independent Telephone Association of America

BY FRANK L. ELDRIDGE

ONE of the most important questions which has been referred to the Service Department of the Independent Telephone Association of America for solution at any time, and one which is of great importance to every toll line company, is the question of how to increase the long distance business.

Advice on this particular subject was asked for by one of the eastern member companies some time ago, and the matter was gone into quite fully with several of the larger operating companies, who related the experience they had had in building up their toll business, and the manager of the one company stated:

There is no royal road to building up long distance traffic, for habit is against one. The only thing to do is to keep everlastingly at it, enclosing circulars in the bills and constantly reminding the public of the service. Also giving extra rapid-fire service will win a good deal of patronage

Another large operating company suggested that one of the best methods for increasing toll traffic is by rendering good service and suggested that service tests be made regularly and examinations of the operating force he held at regular intervals, as local subscribers calling toll will not wait patiently for long distance to answer, and all such calls should be promptly taken care of. In general the recommendation made by this company was that efficient service would increase the toll business.

The commercial superintendent of perhaps the largest independent operating company in the field stated that the question of securing toll business is one of the most serious problems of the telephone field, and that this class of service was one of great interest to him, as his company had increased its toll business the last four years at the rate of 14 to 20 per cent per annum.

In building up this new business, he stated that personal solicitation was, in his opinion, one of the best methods of increasing the traffic, but good men must be had who are tactful, yet persistent. Another suggestion was that only the operator handling the toll business in the private branch exchanges must be kept in touch with, but that it was necessary to interview regularly the head of the concern and get him interested. Instances have been cited where a box of candy properly placed had shown greater results than a month's hard work. Newspaper advertising, circulars, epigrammatical slips enclosed in monthly bills are all good features from an advertising point of view. He also advised that wherever a question of inferior service arises, one of the company's salesmen or solicitors is requested at once to make a full report of the complaint of poor service and not only test out the toll trunks, but have the local lines at both ends tested. It is very often found that a complaint is one of the best means of getting in on the business, as it gives an opportunity of not only testing out the lines, but of interesting the operator and the head of the house in the toll business.

This commercial man also states that it requires tremendous energy and stick-to-it-iveness on the part of the solicitors as well as the head of the commercial department in building up this valuable traffic. Extra labor is never considered and his company will have its representative call on a man 51 times if they do not land him on the 50th attempt. But one of the main assets of the long distance company is keeping the service right up to date; never allowing it to lag either in season or out of season, the same high standard being maintained at all times.

Naturally the question of efficiency and proper rates must be considered when a campaign is to be carried on in the building up of this valuable service.

From personal experience I have found other methods than those suggested as being very valuable in increasing the long distance business. Some years ago I was employed by a large corporation in the telephone field and not only prevailed upon the company's patrons to use the service to a greater extent, but endeavored to have messages routed over our toll lines that was being handled by the telegraph companies. It was also part of my duties to make the service tests and keep a general line on the long distance business. It so happened that I left the employ of this particular company and went with another competing telephone company. At the time I took up my new duties, the long distance traffic being handled, both good and canceled, did not amount to more than 75 calls per day. There was one asset which I took with me to the new company, and that was I knew personally a great many of the heavy toll users, but I found that other methods than knowing the subscribers and inducing them to use the service had to be employed.

The first step was to ascertain whether or not the circuits of the new company were in good condition for commercial purposes, and make a comparison of the rates, also investigate the speed of service. Where it was possible to give good commercial service I immediately got in touch with all toll users that I could bring to mind, and not only called upon them weekly or monthly, but continued to interview them whenever in the neighborhood, calling on them at least monthly. They would give me the story that they were well satisfied with the service they were using and did not believe they would care to make any change, but I persisted in asking that they at least place a call for one of their clients over the lines of the company which I represented. If they would not do this, I sometimes made a test call, and allowed them to see that the service was just as good as when talking over the competing company's lines, and in a good many instances they were able to get through a great deal sooner due to the heavy congestion which usually exists during the busy period.

By keeping after these subscribers and prevailing upon them to try at least one call, they will eventually start using your service—that is, providing the transmission and other conditions are just as good as those of the competitor.

Another way of getting a line on the toll traffic is to scrutinize daily, both the good and canceled tickets and call on each and every firm using the service or which has attempted to use it. Without a doubt business can be revived which has been lost due to the loss of calls because there was no telephone in the office or residence of the party called at the distant station, and similar reasons. In this particular condition I found that the best method of landing the business was immediately to get in touch with the manager of the distant point, posting him fully regarding the circumstances, and by team work

between the solicitor or manager of the originating and terminating points, putting forth every effort in inducing their respective subscribers to use the service, eventually new business is secured. I know a number of places where telephones have been installed at the distant point where independent service had not been used in the past, by the two offices involved co-operating with each other in the way of getting subscribers started in using their toll service. If it is found that the toll service is good, in many instances a new installation will take place and the local traffic also be increased.

To my mind one of the best ways of increasing the toll business is quick action on the part of the managers at originating and terminating stations in promptly interviewing subscribers as soon as they ascertain that long distance service is being used over other company's lines —through these methods of building up the toll business the particular company I was interested in increased its business in less than one year over 75 per cent, and no doubt the increase of long distance traffic in the offices of one of our member companies who recently wrote us for advice on this subject, increasing as high as 22 per cent in some exchanges, is partially due to the information which has been secured through the service department. Indeed, the company which has been advised in this matter believes that the increased long distance business is largely due to the information the service department has furnished.

This question of increased toll traffic is extremely important to every company. Toll circuits should be in use every minute during the busy period of the day. The service department is in a position to help, not only in increasing toll business, but in establishing the highest standards of service in every department, and independent companies writing to it for advice will receive its fullest co-operation in every respect.

Telephone Work Not Injurious to Eyes

As evening manager of one of the largest telephone exchanges in Chicago for four years, I had an opportunity to study and observe the effects of telephone switchboard operating on the employes' health, with particular reference to the eye, and have come to the definite, unbiased conclusion that they are not injured by such work, declares Dr. Le Roy Thompson.

Where symptoms such as headache, insomnia, vertigo or other forms of nervousness appear, we found that it was due to some abnormality in the operator's eyes themselves, which would have given trouble had she been employed at any of the other ordinary girl occupations of today. The recovery was prompt when proper glasses were fitted by an oculist or treatment instituted where it was necessary.

One observation that I would like to draw special attention to is, a telephone girl is like any other girl, she dislikes to wear glasses, and this fact combined with an attending family physician's neglect or ignorance prevents many girls from getting prompt relief from her otherwise improperly diagnosed sickness, which really had its origin in eye strain.

As oculist and aurist for the Chicago Telephone Company and chief physician for the Employes' Benefit Association for the past three years, having practically all cases of sickness among the employes come under my observation, I have been enabled to continue accurate investigation in occupational diseases or physical strain which was begun while actively associated as manager.

Before a girl is taken into the employ of the telephone company she is given a physical examination and her eyes are examined as far as practical vision is concerned. Of course, this keeps out many who would otherwise succumb to eye trouble of one kind or another, but it is impossible to eliminate everyone who suffers only a slight abnormality. I think the efficiency of such an examination is aptly illustrated by what I saw on a visit to an exchange the other day.

One group of twenty-seven girls, all active, healthy looking specimens of young womanhood, and not one was wearing glasses. Another group of nineteen, and only three wearing glasses. Go into any large office and look over the clerical force, and you will be astonished at the number who are forced to seek the assistance of glasses in their work.

The telephone operator sits facing the switchboard, with her face approximately sixteen inches away, measurement taken at the level of the eye. The maximum distance at which she uses her eyes when reaching to complete a call or pick it up is twenty-nine inches. When answering a call or completing a connection she uses her focusing eye muscle only three to five times and never twice at the same distance consecutively.

This point cannot be emphasized too strongly, as the varying distance, even though not far enough for complete relaxation to take place, is nevertheless enough to change to rest the eye much more than in many other occupations.

Compare the work done by typesetters, bookkeepers, stenographers and draftsmen, and you can readily see how much more relaxation a telephone operator has than any of the others who continuously apply themselves to their given occupation, which is all practically at the same distance from the eye.

The signal lamps, the strongest of which is less than one candle power, has a protecting cover, or opal, as it is called, made of glass which is semi-transparent. They measure nine millimeters across at their greatest diameter and six millimeters thick, being made in three colors, white, red and green. These opals amply protect the eye from ultra-violet or chemical rays. Heat, of course, is not a factor worth consideration from so small an amperage and candle power.

Telephone operators are not subjected to as much eye strain as the average clerk. Conditions which are apt to be blamed on the occupation have been absolutely proven to clear up after the eye condition was treated and glasses fitted where necessary, the operator continuing at the same occupation under exactly the same working conditions as before.

Concrete Poles Withstand Winter Storms

The great strength of reinforced concrete telegraph poles was proved to a demonstration during the violent storms of this winter. The Pennsylvania Railroad Company states that this was shown in the case of their telegraph lines, where a large number of reinforced concrete poles were exposed to the recent heavy storm, which practically isolated New York City. Though many of the wooden poles were broken down by the wind, in no case did a reinforced concrete pole fall, and this in spite of the fact that so severe was the stress that the wooden cross arms upon some of these poles were broken. They are made of Portland cement, reinforced with steel rods. They have the further advantages, in addition to their strength, that they do nt rot at the ground, and that they never rust, as do the steel poles.

European Telephone Development

Translations from the Foreign Press and Communications from European Engineers

By FRED W. SCHOLZ

PROFESSOR ARTHUR KORN gave an illustrated lecture on telephotography and the general subject of transmission of pictures by wires at a recent meeting of the Elektrotechnische Verein, Berlin, of which lecture we give an abstract. The lecturer first gave a brief outline of the work accomplished by the selenium method in transmission of pictures, which we omit as the apparatus has been superseded by more modern appliances, and as the various instruments have been described in past numbers of TELEPHONE ENGINEER.

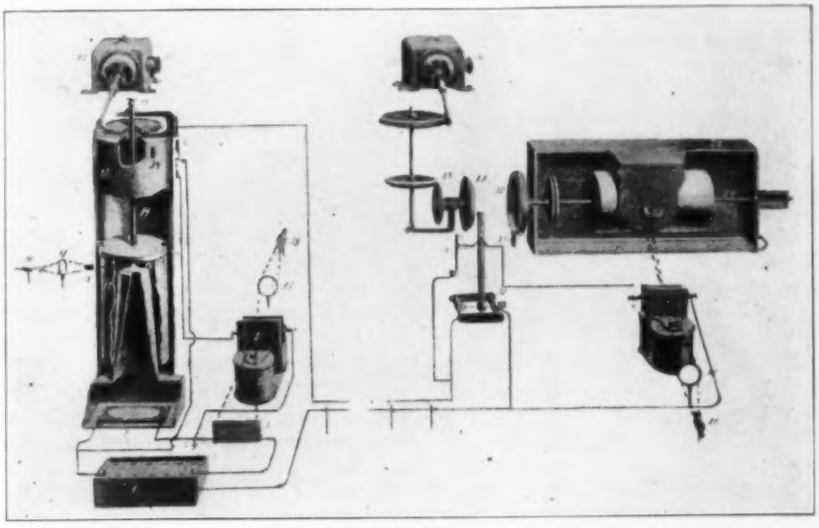


Fig. 1. Late Improved Telephotographic Instruments.

The greatest improvement up to recent years was made, when in 1906 Korn and Will together worked out an improved type, shown in Figure 1, where a galvanometer was used in the receiving station, and a selenium compensator, in order to decrease the error due to the inertia of the selenium.

In this receiving instrument the vacuum tube which sends the rays upon the receiving film has been left out, and a Nernst lamp is used as source of light. The Nernst lamp is seen in the figure in *26*. The line currents are sent through a bifilar galvanometer *9*, which in this case consists of two fine metal wires, extended between the poles of an electromagnet, a tiny aluminum foil being pasted to the middle of the wires. If a current is passed through the wires, these, along with the aluminum foil, are deviated in the plane vertical to the lines of force of the magnet, either upward or downward, depending on the direction of the current. The light of the Nernst lamp *26* is now concentrated on the aluminum foil by means of a lens *27*, and with the aid of a second lens a picture of the foil is thrown upon an opening *28* of the receiving box. The apparatus is arranged in such a way that without current, the shadow of the foil just covers the opening, while with current, the shadow releases the opening more or less. The light entering the receiving box is concentrated by means of a lens on a minute element of the receiving film, and thus this element of the receiving film receives the more light in proportion as the aluminum foil of the galvanometer is deviated by the line currents, i. e., in accordance with the tones of the corresponding elements of the original photograph. The bifilar galvanometer is such a sensitive and rapid instrument, that it was possible with the comparatively weak line currents (maximum of one milliampere), to obtain a sufficient rate of speed of transmission, namely 6-12 minutes for simple photographs, like portraits. Of course, it must be mentioned that for this purpose the selenium compensator was a very useful element. The principle is as follows: A second selenium cell (compensating cell) *3* is bridged with the original selenium cell *2*, and both cells get about the same light by passing the currents to them through a bifilar galvanometer *5*, somewhat similar to the one described, varying the light sent to the compensating cell, as the need arises. The cells are a little different, however. The original cell is very sensitive and of very low inertia, the compensating cell of greater inertia and lower sensitiveness. The result is that the two cells balance each other and that the faults of one compensate for the faults of the other and give results that make up for the inertia of selenium. The results achieved with the improved machine were encouraging and transmission of pictures between Paris, Berlin and London was very successful.

Transmitted by Telephotography.

The chief trouble with the transmission of pictures lay, however, in the disturbances of the telephone lines used for this purpose by the neighboring telegraph wires. On the lines Berlin-Paris transmission of pictures could be carried on practically only between 1 and 2 o'clock a. m., when telegraph communication was at its lowest. The next question was therefore the increase of the line currents to such a point, that they would not be open to the interference by outside disturbances. Before going into this point, however, it will be necessary to give an account of the present state of the telautographic method, for which purpose we show Fig. 2, which is the result of the joint work of Korn and Glatzel.

In this method the picture to be transmitted is transferred to a metal foil by means of matter of non-conductive char-

acter. Photographs use a coating of chromium gelatine, which becomes insoluble in water through the effect of light so that after washing the places not touched by the light are metallically pure. The foil is wound over the rotating transmitting cylinder *4*, and while this is turned by an electric motor *1*, the foil is in constant

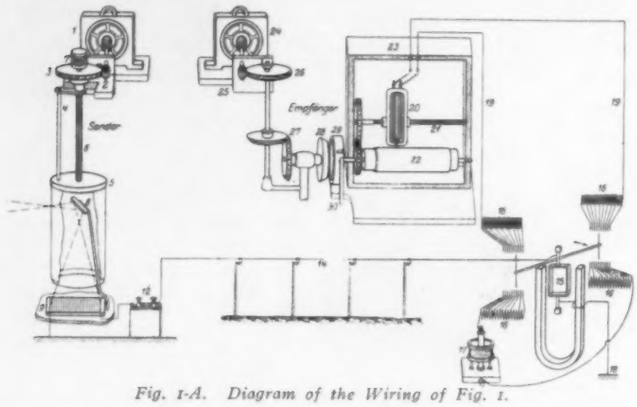


Fig. 1-A. Diagram of the Wiring of Fig. 1.

touch with a metal point *9*, which like the points of a phonograph, moves with each rotation of the cylinder, slightly in the direction of the cylinder axis. Thus the metal point touches the entire length of the foil in a fine narrow screwthread line, and if we send the current of a battery through the contact *11*, the foil, the point *9* to the receiver, this current is interrupted every time that the point touches a non-conductive portion of the film. The current impulses obtained at the receiver are used to compose the picture again. Here the receiving film is wound around the receiving cylinder *28*, which is driven by a motor *27*, and rotates and moves in the direction of the axis, with each revolution, similar to the sending cylinder. The Nernst lamp *35* with the aid of lenses lights any element of the receiving film, when the lamp enters through a narrow slit *31* into the receiving box, and where the light is collected by a small lens and concentrated on the receiving film. The light coming into the box through the crack is always shaded off and affected by the currents coming from the transmitting station. To this end the line currents are sent through a galvanometer *33*, which is made up of a single fine metal band, between the poles of a strong electromagnet *32*, and is deviated by the electromagnetic forces of the magnet, when current is sent through the metal band. The light of the Nernst lamp *35* is concentrated by means of a lens *34* on this band, and with the aid of another lens a real, magnified reproduction of the picture is thrown on the crack, which leads into the receiving box. The shadow of the band hides the opening when there is no current, and leaves it open for the passage of light, when there is current. We get an impression on the receiving film, when in the transmitter the metal point strikes a conducting element of the foil, and there is a photographic impression, when the point in the transmitting station touches a non-conducting portion of the film. The speed may be considerable, as high as 2,000 signs per second, as very little energy is needed in the receiver to hold the incoming light. The movements of the band in the receiving galvanometer are so small that they can only be noticed when magnified.

We come now to the latest improvement, which reinforces the currents and improves the arrangements Finally the author and Dr. Carazzolo worked out a method, in which an electromagnetically rotated indicator rides without any friction over collector-like combs, which consist of alternately conducting, alternately non-conducting foils, the transition being such that no direct contact is made, but that the transition from the indicator end to the conducting plates of the collector will be executed by sparks. Of course, it is impossible to pass these reinforced currents over the low tension current apparaand details of the selenium method. As a matter of fact the telautographic method has only become so successful within the last few years because it can work with 10 to 15 milliampere currents while the selenium method can only work with 1 milliampere. For long distances the selenium method is without question the better, provided the currents can be made of greater strength. As regards the constant relays we might mention the ordinary telephone microphone relay or the Lieben tubes which may be used for the purpose. For a step-up relay, however, which shall meet all demands we will have to employ a different system, and this will be explained in a few words. At first Dr. Korn thought of the plan to use a rotating mirror, which is rotated electromagnetically by the currents of the picture and to light up several selenium cells after each rotation and thus to release the stronger line currents. This was too complicated, however, and was abandoned. tus, and to have them pass in the form of sparks from the ends of the needle points. Weak, high frequency Tesla currents are therefore used, which in their turn

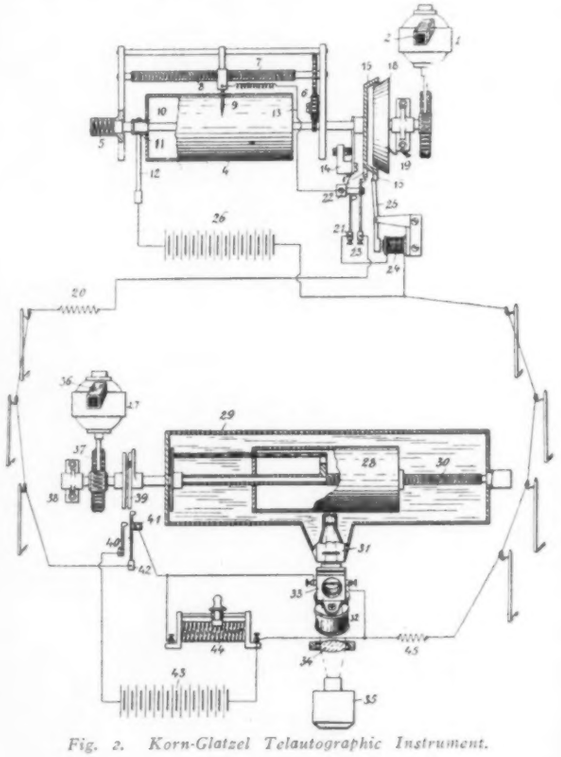


Fig. 2. Korn-Glatzel Telautographic Instrument.

release the reinforced currents at another place. Fig. 3 shows this new step-up relay.

We have a Tesla transformer *1*, from whose secondary coil poles conductors, one of them in series with a condenser *2*, lead to the metallic plates *13* and *14*. An

indicator *15*, made up of non-conducting material, is rotated in a galvanometer constructed according to the Deprez d'Arsonval principle, by the picture currents sent by the selenium cells. The indicator carries at each end, vertical to its plane of motion, a thin wire pencil *16* or *17*, and these wire pencils move among the metallic

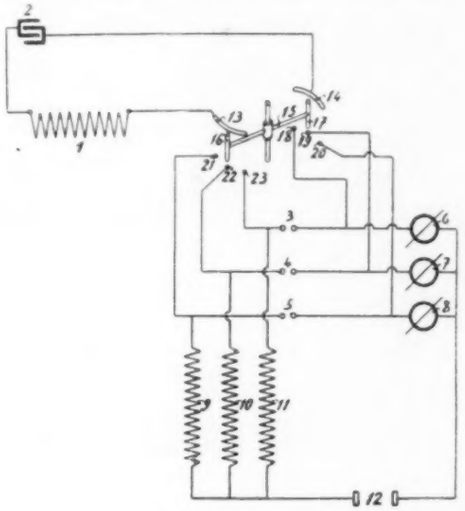


Fig. 3. Step-up Relay.

plates and above the two collector-like combs *18* to *20*, and *21* to *23*. These are constructed of alternately conducting and alternately non-conducting plates, only three conducting ends being shown in *18, 19, 20* on the one side, and by *21, 22, 23* on the other side. From *23* a connection leads over the spark gap *3* to *18*, and another from *22* over *4* to *19* and from *21* over *5* to *20*, and so on. According to the position of the galvanometer, the Tesla currents pass over a spark distance *3, 4, 5*, or in the case shown in the figure, they pass over the spark gap *4*. The indicator is not impeded in its movement by friction with the fine foils; the ends play freely, and the Tesla currents pass in form of fine sparks. The low tension current instrument influenced by the picture currents, which must be very sensitive and very speedy in its operation, directs the Tesla currents either over the spark distance *3*, or *4* and *5*, in three steps, or, as has been done, in 10 steps. We now use the property of Tesla sparks to give high tension arcs between the spark gaps *3*, or *4* and *5*, when we connect direct or alternating current lines in parallel to the poles of these spark gaps. With the aid of a battery or generator *12* we connect such currents to these poles, preventing as much as possible the passage of Tesla currents through the high tension current lines by using the inductances *9, 10, 11*. The high tension currents, moreover, in this arrangement are kept away from the low tension current instruments. The reinforced currents are now used according to demand in the receiver end of the line. With lines of great capacity it is advisable to send these currents in both directions and to arrange the opening in the receiving box in such a way that it will allow the same amount of light to pass, when the reinforced current goes in one direction, as when it comes from the other direction.

The reinforced currents are now used to make perforated strips in the laboratory, which represent the picture to be transmitted. These perforated strips are used in connection with pointers or pins which, according to the position of the perforations passing under the pin, and according to the electromotive force, send the picture with the transmission speed desired. At the receiving station the bifilar galvanometer meets all requirements in reference to sensitiveness and rapidity. It is also possible to reduce the picture with all its tones to a Morse-like alphabet and then send this picture like an ordinary telegram. At the receiving station this telegram is transferred by means of a machine into a perforated strip and from this then worked into the picture by means of the bifilar galvanometer. This last process is the safest, but also the most expensive. It might also be possible to use this method for wireless telegraphy of pictures. It might perhaps be employed for television as well, at least one of its phases, the possibility of seeing cuts of photographs at distances. If we imagine as large a number of arcs as can be obtained with the Tesla sparks, which rotate or describe straight and curved lines, it might be possible to reproduce these arcs in the proper form at a receiving station and form a picture to the eye.—*Elektrotechnische Zeitschrift.*

IMPROVING SIMULTANEOUS TELEGRAPHING AND TELEPHONING.

WHEN using wires for both telegraphing and telephoning it often happens that, if one of the double lines has shunts, there arise disturbances which necessitate the cessation of telegraphing. The difficulty is that telegraph noises are heard in the telephone instruments, which prevent communication, and that the calling relays of the telephone instruments are made to call by the telegraph currents and give trouble in this way. Investigations were made by F. Ambrosius and his results are here given in detail.

1. The main reason for the trouble lies in the fact that the battery voltage for telegraph work is not of the proper magnitude. Due to the low ohmic resistance of the telephone lines, whose branches are moreover parallel for telegraph operation, the resistance of the outside line is too small even with longer lines. Even when connecting the simultaneous coils used in the German system, the resistance is only 1,100 ohms for the entire line. With the longest lines low voltages are used. In ordinary practice it will be found that about 50 volts will be sufficient for battery voltage. In moist weather this might be increased to 60 or 70 volts. The following table shows the distances in kilometers, the strength of the wire and the proper battery voltage as estimated by the author:

Table 1. Bronze Wire in Millimeter.

	Volts				
Distance, km.—	2	3	4	4.5	5
50	40.4	39.0	38.6	...	...
100	42.8	40.1	39.3	...	...
200	...	42.2	40.4	...	...
300	...	44.3	41.6	40.8	...
400	...	...	42.8	41.7	...
500	...	...	44.0	42.7	41.8
600	...	...	45.1	43.6	42.6
700	...	...	46.3	44.6	43.3
800	...	...	47.5	45.5	44.1
900	...	...	48.7	46.4	44.8
1,000	...	...	49.9	47.4	45.6

2. The telegraph noises in the receivers are caused by the fact that the telegraph current passing through the two coils of the simultaneous coil is of different strength and that there is therefore at the ends connected to the two branches a difference in potential. This tends to equalize by way of the bridged telephone system, which shows in noises in the telegraph instrument or in the operation of the calling relay. To find the magnitude of this difference the author made careful experiments, and changed the shunt from 3,000 to 500 ohms. Table 2 gives all possible measurements for these tests. As the measurements were made with the instruments of the Imperial

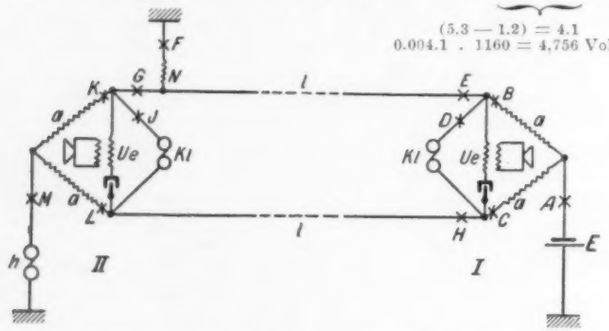
Telegraph Department, during rush hours, some of the figures are not exact in the decimal places. In one case we have shunt $N=(\infty)$ infinity, both in the sending exchange *I* (*B* & *C*), and the receiving station *II* (*K* & *L*); the current strengths are therefore the same and show no potential, we have in a shunt of 3,000 ohms the difference in strength, in exchange *I*, 0.8 milliampere, and in exchange *II*, 1.3 milliampere. In another case the difference is 2.6 and 4.1 milliamperes respectively, which corresponds to a difference of 4.76 volts.

3. Starting from the assumption that the differences are increased by the high resistance of the shunt coils of 1,160 ohms, tests were made to substitute coils of small resistance (250 ohms). These are just as good for simultaneous operation and show no great losses in the telephone current efficiency. Measurements showed that the difference at points *K* and *L* mentioned before was reduced to 2.55 volts. If the calling relay is cut off, the difference for these points with small coils is only 3.225 volts, while with big coils it is 10.208 volts.

Table 2. Tests with Simultaneous System.

N	A	B	C	D	E	F	G	H	I	K	L	M
∞	12.0	6.0	6.0	0	6.0	0	6.0	6.0	0	6.0	6.0	12.0
3,000	16.0	8.2	7.4	0.6	9.0	5.5	3.4	6.8	1.0	4.5	5.8	10.1
2,000	17.5	9.0	8.0	0.8	10.0	7.5	2.4	7.2	1.3	3.9	5.7	9.4
1,000	20.5	11.0	9.2	1.4	12.5	12.2	0.3	7.9	2.2	2.6	5.6	8.0
900	21.0	11.4	9.5	1.4	13.0	13.0	—0.2	8.0	2.3	2.4	5.4	7.7
800	21.5	11.7	9.8	1.5	13.5	13.8	—0.4	8.2	2.4	2.2	5.3	7.5
700	22.5	12.2	10.0	1.7	14.1	14.8	—0.9	8.3	2.7	1.8	5.3	7.2
600	23.5	12.7	10.3	1.8	14.8	16.0	—1.5	8.5	2.9	1.6	5.3	6.8
500	24.3	13.3	10.7	1.9	15.5	17.3	—2.1	8.8	3.1	1.2	5.3	6.4

$(5.3 - 1.2) = 4.1$
$0.004.1 \cdot 1160 = 4.756$ Volt



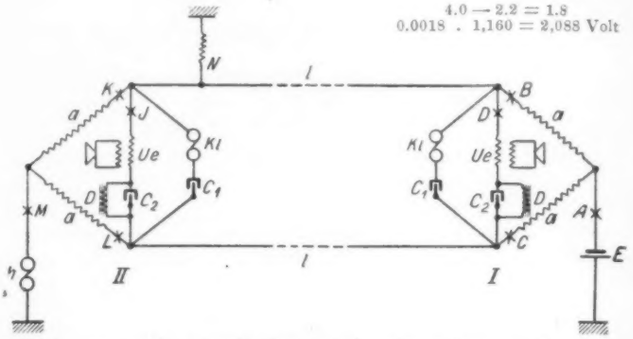
4. The trouble with these arrangements is, however, that the telephone relays are made to operate by the compensating currents, and that, when the relay is not connected, there is no balancing by way of the translator, due to the condenser which is in series with it. To avoid this trouble, a condenser *C1* was connected in series to the telephone relay, which was to prevent the passing of the compensating current, and a choke coil *D* of 100 ohms was placed parallel to the condenser *C2* lying within the telephone circuit. Table 3 shows this very well. The difference in potential at points *K* and *L* was only 2.088 volts, even when using shunt coils of large size. When using a transmitter with a secondary coil of only 80 ohms resistance, this difference decreases to 1.16 volts. When using small coils, the figure drops to 1.47 and 1.1 volts. In these arrangements it is immaterial whether the telephone relays are connected or not, as in each case the compensating current passes over the translator and the inductance coil. Consequently the relay will not operate and the potential differences in the influenced points *K* and *L* will be smaller than is usually found in such systems.

5. All the above systems have the disadvantage that the calls in the telephone line are connected with considerable current losses and that unintentional groundings at the switchboards disturb telegraph operation or prevent signals from being seen or heard. This can be avoided if ring translators are used in place of the shunt coils. These translators have in each coil only 40 ohms

Table 3. Simultaneous Tests.

N	A	B	C	D	I	K	L	M
∞	12.0	6.0	6.0	0	0	6.0	6.0	12.0
3,000	15.9	8.0	7.9	0.8	1.8	5.0	5.3	10.1
2,000	17.5	8.6	8.5	1.0	2.3	4.4	5.1	9.5
1,000	20.8	10.6	10.3	1.5	4.0	3.4	4.6	7.8
900	21.7	11.0	10.6	1.6	4.2	3.2	4.5	7.6
800	22.4	11.3	10.9	1.8	4.7	3.0	4.4	7.3
700	23.0	11.7	11.3	1.9	5.0	2.8	4.2	7.0
600	24.0	12.3	11.8	2.0	5.3	2.5	4.1	6.5
500	25.2	12.8	12.3	2.3	6.0	2.2	4.0	6.0

$4.0 - 2.2 = 1.8$
$0.0018 \cdot 1,160 = 2,088$ Volt



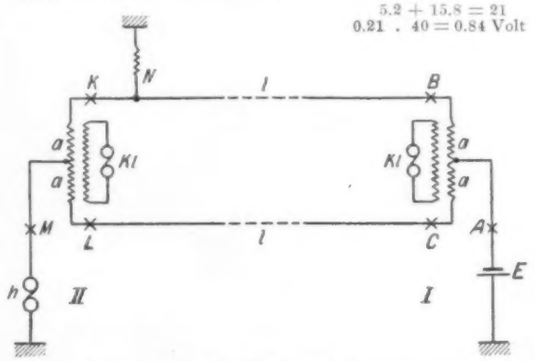
resistance, and permit the total separation of the telephone system from the outer line, so that ground connections cannot influence telegraph operations in any way. Table 4 shows the results obtained by the experiments. The potential difference at points *K* and *L* is only 0.84 volts, although at those points we have currents of considerable strength, flowing even in different directions.

For calls in the telephone line we would use alternating current from the exchange, which then could be transformed by the ring translators. At the exchange called we would have a second transforming and the current received flows undiminished through the telephone

Table 4. Simultaneous System with Ring Translators.

N	A	B	C	K	L	M
8	14.0	7.0	7.0	7.0	7.0	14.0
3,000	18.3	9.4	9.0	4.4	9.0	13.5
2,000	20.2	10.5	10.0	3.2	10.0	13.0
1,000	25.7	13.5	12.3	—0.2	12.2	12.0
900	26.8	14.2	12.8	—0.8	12.8	11.8
800	28.0	15.3	13.3	—1.5	13.2	11.5
700	29.5	13.0	14.0	—2.5	13.8	11.3
600	30.0	13.5	15.0	—3.6	14.8	10.8
500	33.0	14.4	16.0	—5.2	15.8	10.5

$5.2 + 15.8 = 21$
$0.21 \cdot 40 = 0.84$ Volt



relay. The best result is obtained when using a. c. of 25 periods with a condenser of 0.75 Mf. for each relay. Finally it is possible to reduce the telegraph noises in the telephone instruments by using a condenser of 2 mf. The

following table shows the current strengths needed for simultaneous operation, when employing ring translators:

Dist., km., bronze wire in mm.—	2	3	4	4.5	5 mm.
50	23.4 V.	22.0 V.	21.6 V.	...	...
100	25.8	23.1	22.2	...	...
200	...	25.2	23.4	...	...
300	...	27.3	24.6	23.8 V.	...
400	...	...	25.8	24.7	...
500	...	...	27.0	25.7	24.8 V.
600	...	...	28.1	26.6	25.6
700	...	...	29.3	27.6	26.3
800	...	...	30.5	28.5	27.1
900	...	...	31.7	29.4	27.8
1,000	...	...	32.9	30.4	28.6

—*Telegraphen u. Fernsprech. Technik.*

THE HAMBURG TIME SIGNAL SYSTEM FOR TELEPHONE SUBSCRIBERS.

THE question of giving time accurately to telephone subscribers has received the attention of Hamburg engineers for several years, without, however, being fully settled. Several years ago an arrangement was used whereby a current impulse was sent after the 60th second to the telephone lines, allowing the subscriber to take the occasion to set his watch. The increase of subscribers grew beyond the capacity of these lines, and the observatory and the telephone department combined to work out a more effective system for the subscribers. The old signal was changed so that from the 55th to the 60th second a siren-like tone was emitted, and that after every 5th minute an alarm bell rang for 5 seconds. The few

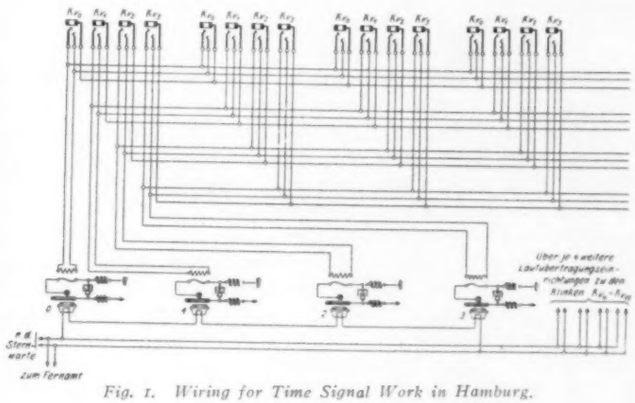


Fig. 1. Wiring for Time Signal Work in Hamburg.

trunk lines from the observatory which ended at a special switchboard in the Hamburg main exchange were not sufficient for the great demand. Moreover, other scientific institutions, among them the geophysical institute of the University Göttingen, demanded that the time signals be sent to that institution as well as all those having a seismograph, so that the exact time could be obtained at regular intervals. When the new exchange was equipped special attention was paid to this problem. To make the time signals accessible to the Hamburg subscribers, the observatory and exchange wires were connected in a multiple board, using a 20-part jack strip in every jack panel. As the subscribers, who would ask to be connected with trunk line 10,000, the number given to the time signal lines, would only have to listen to the signals, it seemed immaterial how many of them called for that connection at any one time. In order to make this line accessible to distant exchanges and institutions, audible signals were also installed having a ticking noise appear in the line two or three times per second. This ticking on that observatory line informs the exchange listening, that the line is busy. The long distance exchanges and outside institutions are not permitted to enter into this observatory line when they hear the busy ticking. For the Hamburg subscribers the observatory goes even further and sends a clicking noise through the receivers at every even second. Moreover, not only the fifth minute but within a period of 10 minutes every single minute is noted by a special signal. This allows any subscriber to get his time within any one minute, and he can obtain the desired information at a maximum time of 3 minutes. From the 55th to the 60th minute we hear a siren-like tone, and the full minute itself is given by a whirring noise, which varies for the several minutes. The arrangement which allowed 20 subscribers to listen to the time signals at the same time was open to one abuse, however, on which the telephone department had not figured, and this was the abuse by various employes of the subscribers to use the observatory exchange for conversation and prevent others from getting the time signals. Finally things grew so bad that the department worked out a new plan, where a mutual conversation was impossible. For this purpose the subscriber lines were placed in multiple over a number of telephone receivers, four of which were always placed in series. Each receiver is united with a microphone with common diaphragm case, so that the vibrations of the receiver diaphragms are transmitted to the microphone membranes. The microphones are fed by the battery at the exchange, using a feed coil with two windings each of 150 ohms, a 2 mf. condenser and an induction coil. Fig. 1 shows that the secondary coil of each sound transmission apparatus is connected with the same number jack of the strip of jacks devoted to the time signal work at the jack panel of the multiple board. The transmitting device *1* is connected to jack *1*, etc. Corresponding to the three operating divisions of the exchange, the multiple system extends only to the third of the total number of jack strips. In each jack panel of an operating division we have therefore six jacks connected with six time signal devices. Two jacks are for the suburban work, and there is also a direct connection between the observatory, the exchange and the long distance board. Before making the desired connection the operator at the time signal switchboard tests for busy wire and tries to obtain an open jack. If there are no open jacks the line is called busy. At worst there may be simultaneously 18 local connections, two suburban calls and one long distance connection. As the diagram shows there is no possibility of communication between subscribers over the time signal lines.—*Telegraphen u. Fernsprech Technik.*

NEW SYSTEM OF PRODUCING ELECTRIC CURRENTS FOR WIRELESS TELEPHONY.

JOURNAL TELEGRAPHIQUE describes the spark gap produced by E. L. Chaffee, whereby it is possible to generate undamped oscillations for wireless telephone work. The cathode consists of aluminum, the anode of copper, silver or a similar metal. The plane surfaces of the electrodes are one to two square centimeter in area, are exactly parallel, and about 0.07 mm. apart. The sparking distance is within an hydrogen atmosphere and the electrodes also are water cooled. As cathode only the aluminum seems serviceable, as it can be used several hundred hours, until the surface is covered with oxide. Copper and silver are especially serviceable as anodes. The hydrogen is absolutely necessary and is to be pure and slightly moist. For smaller generation air cooling is sufficient. The current source is a direct current source of 500 volts. The spark gap with the coupling coil in series is placed parallel to the condenser, which in its

turn is connected to the current source by a self-inductance coil for each connection. A variable resistance serves to control the current strength. The secondary circuit coupled with this primary circuit, the real oscillation circuit, consists for tests only of coupling coil and condenser. The microphone is grounded. The connection between length of spark, or better, between electrode distance and current strength in the oscillation circuit shows that the secondary current strength is in general independent of the electrode distance. With 0.18 mm. distance the current strength was the greatest, but here the discharge became irregular and even stopped. From 0.04 to 0.09 mm. is the best distance. The hydrogen should be kept at atmospheric pressure. Primary and secondary circuits must, of course, be tuned in such a way, that the ratio of their frequences gives a whole number. With a single spark gap it was possible to obtain in the secondary circuit 40 to 50 watt energy with an effectiveness of 30 to 40 per cent. The most favorable current strength in the primary current is near 0.3 to 0.8 ampere. The experiments with the above device in wireless telephone work gave good results. Conversation was free of outside noises and gave clear, loud sounds. The distance bridged is great when we compare the comparatively small energy. With the one sparking distance used a distance of 64 km. was bridged for efficient wireless telephoning.

VIBRATIONS OF TELEPHONE DIAPHRAGMS.

ANNALEN DER PHYSIK brings an interesting report of the experiments made by M. Sieghahn with telephone diaphragms, while studying their vibrations. The registration of the estimates of vibrations were obtained by watching the quantity of light passed through a crack, whose movable edge corresponding to the diaphragm movements is brought nearer or further away from it, which therefore changes its width constantly, proportional to the amplitudes of vibrations. The photograms were measured photometrically and gave curves which are important in judging the transmission of vowels. The movable edge of the registering crack consisted of a razor edge of 2-4 mm. which was fastened to a piece of aluminum and was then fastened on the telephone diaphragm in such a way that it moved in its own plane when the latter vibrated. As constant edge the real picture of the edge of a crack illuminated by means of an arc lamp, reduced by means of a reversed microscope and projected into the plane of the movable edge of the registering crack was used. A second slightly magnifying microscope projects the changing picture of the crack upon a moving screen or a plate, which then registers the width of the crack. A ratchet wheel making 166 signs per second marked the time for the experiment. The photograms found gave a series of black vertical strips of varying width, separated by lighter strips. These were now measured photometrically. In one method the partial picture of a vertical Nernst wire was projected upon the plate which was moving with a slow rate of speed, and the light passing through at each line was concentrated on a Ruben thermo-element. The electromotive forces obtained were then measured with a galvanometer. The second method used a selenium cell. Its light changes with the tone of the lines on the moving plate and the currents corresponding to the diaphragm vibrations were registered by means of an Einthoven galvanometer. The curves obtained gave characteristic vibrations for various vowels. The diaphragm in the theoretical work has been considered theoretically as an infinitely thin, freely oscillating plate and as a vibrating mass. The value of the maximum amplitude was estimated at 0.0002 mm.

Year's Gain by Public Service Corporations

Based upon the annual reports of earnings furnished the *Financial World* for the Fifth Annual Public Service Corporation Review by 286 of the leading companies for the fiscal year 1913, and which appear in this number, the showing made must prove very gratifying to all interested in this particular field of enterprise.

The tabulated aggregated earnings reflect a healthful and normal increase in gross and net earnings, despite the fact that in other avenues of enterprise it has proven difficult to maintain earnings and profits up to a point where they would indicate no shrinkage as compared with the former year's business.

Gross earnings of these 286 companies for the year were $866,416,400, or $54,857,676 greater than a year ago. The percentage of increase was 6.76 per cent; net earnings were $370,801,186, a gain of $19,492,267, or 5.55 per cent, and surplus after all allowances for fixed charges and dividends was $81,113,567, a gain of $2,655,893, or 3.54 per cent.

During the year these 286 companies disbursed to investors in interest on bonds, including all other charges, $150,223,407, which was $10,787,446, or 7.73 per cent, more than a year ago, and in dividends there was paid $130,777,354, which amount was $5,881,041 greater than in 1912, or a gain of 472 per cent.

From the above tabulation it is apparent that the public service corporations in every respect have forged ahead both in gross and net revenues and in the profits and interest they have been able to divide with those whose capital has made their financing possible and successful. While the surplus over all charges and dividends shows a smaller ratio of increase, this is due to the fact that during the year the 286 companies increased their bonded debt by $87,820,793, the charges on which absorbed profits and cut into the surplus account.

This increased indebtedness was incurred principally for improvements and extensions which have not yet had much of an opportunity to develop additional traffic and revenues, but when they get fairly into play they are expected to add proportionately to the revenues of the companies.

What should attract the most marked attention is the vast amount of capital which has been invested in this class of enterprises and which can be taken as a reliable indicia of the prominent position these companies occupy in the development of our country.

Our statistics indicate that the 286 companies have outstanding $2,151,842,261 in bonds. This is $87,820,793 more than in 1912; a total of preferred stock of $592,007,950, which is $18,821,721 greater, and common stock of $2,216,766,418 or an increase of $38,392,053.

Here is a total investment in public service corporation enterprises covering gas, electric light and power, telephone and telegraph and street railway, as well as interurban transportation corporations of over $4,900,000,000.

No stronger proof could be asked for or furnished to support the argument that, next to the steam railroads, the greatest volume of capital has flowed into public service enterprises. The fact that the business has steadily developed into larger proportions with each year has shown the wisdom of this form of investment.

The Lay of a Layman

Just a Few Plain Thoughts on Some of the Aspects of the Telephone Business

BY THE T. E. DOPESTER

WE SHOULD have positive knowledge when we carve our lessons from actual experiences. We never doubt the leader of a brass band. He heralds himself by the noise he makes. On the other hand, a physician approaches us with quiet dignity. We seldom anticipate the brass band, but we usually know when the doctor will arrive. The methods of these men are entirely different.

* * *

This publication adheres to the principle that competition should exist in the telephone business. We never know exactiy what form competition will assume, but our own experience with two telephone systems has taught us one lesson that is set down here for what it is worth. This experience, incidentally, doesn't seem to justify our belief that competition is a good thing.

* * *

For several years the Chicago Telephone Company's Class M service proved itself wholly adequate for our business requirements. Associated with this service we used the automatic system and by its help the telephone bills of the Chicago Telephone Company were held to the figure of $6.00 a month, plus tolls. Up to and including November, 1913, everything ran along in this order. The December bill, without reason which we could trace (for there had been no change in the personnel of the office or of our telephone requirements), jumped to nearly twice the normal figure. This naturally incited curiosity, which was further emphasized when the January bill amounted to double the previously regular charge. The condition continued through February and March, when in self-protection we contracted with the Chicago Telephone Company for a larger service. In making the service change, one exceptional bill dated March 7 amounted to $24.78—four times the amount of the normal bill.

* * *

The only thing we were able to learn from the Chicago Telephone Company which might have been the responsible agency for the extraordinary bills intervening between November, 1913, and March, 1914, was the adoption by the company, during November, of a different system of recording telephone calls in Harrison exchange.

* * *

We have been invited, with the same courtesy that obtains in the several departments of the company, to investigate the details of the new system, but we have not been curious to this extent. As near as we have been able to figure it out, the old method of keeping a penciled score has been succeeded by a peg-counter. The Chicago Telephone Company is not backward about admitting that it has lost untold sums of money due to the method that had been in force for many years prior to last November. Using our own experience as the basis, it stands to reason that the company's contention was well founded, because in our individual case the service that had been so long sufficient for our needs, immediately returned to the operating company one hundred per cent increase over normal.

* * *

If there had been changes in our office which might have forced an increased use of telephone service to the point reflected by the company's bills, we might have been a party to the inflated account, but in so far as we know, our contribution to the condition was nil. If anything, our telephone requirements were less rather than more, because business has not been visibly abnormal during the past year.

* * *

With the discovered tendency of the Bell Company's bills to grow without reason, we naturally sent all our calls the other way in so far as the competitive system would permit. This alternative did not help us nor by any method at our disposal could we reinstate the normal bill as it existed for several years prior to November, 1913. From which it would seem that competitive telephony offers no relief for the oppressed. It would be comforting if we could reconcile these conditions, but we have not increased our need for the telephone and the facts under the circumstances are therefore peculiarly interesting. Telephone operators throughout the country who are desirous of increasing their revenue without any additional outlay of capital should send representatives to Chicago and have them make a study of the method employed in Harrison exchange.

* * *

Confirming our statements, we know of no more simple expedient to suggest than to refer to the operating company's ledger and to count noses in our shop. By the very simple device of an innocent little peg-counter in the hands of an operator, the Chicago Telephone Company has gradually forced an increase in our service bills to the extent of 66⅔ per cent and this with telephone competition!

* * *

It is plainly evident that we are questioning the veracity of a system that is responsible for this disturbance which increases our telephone bill. We have the company's word for it, that the old method of keeping tab on measured telephone service was unsatisfactory—that it failed in bringing in the revenues for service actually performed. Those of us in Chicago who use measured service appreciated fully the very scant effort that is made to supervise our calls. There is something of a rule which variously estimates the ringing time from one to two minutes. I have too little patience to learn how long beyond fifteen minutes the ringing will be continued. I have frequently tolerated that much of it before becoming apoplectic. And even then, I have yet to find an operator who has learned that "your party doesn't answer" on signal. The peg count on measured service will never be in favor of the subscriber. The idea is to contract for three or four times the service you can possibly use and take a chance.

* * *

If Chicago had competitive telephony, the subscriber might be benefited, but Chicago merely has two telephone systems.

* * *

In those communities where two systems have afforded real competition, there are notable examples where the public receives infinitely more than the courtesy which has become an acknowledged fixture with public service

corporations. It is to be regretted that in the two great cities of America the idea seems to prevail that the telephone is a natural monopoly. The people who make their homes in these two great cities have so largely adopted the methods employed by all that they are merely dupes themselves. On the theory it is better to get by without a "scene," they fall for anything.

* * *

As usual, Ohio is up and doing. Ohio has reached the end of its lethargy. Independent telephony is making a noise. The Ohio State Telephone Company having been formed, it promptly acquired control of the Morgan telephone interests in the Buckeye state and were off. The Ohio State Telephone Company starts out with a capitalization of $23,466,200, this being roughly $2,500,000 less than the outstanding stock of the several companies which have gone into the consolidation.

* * *

This latest telephone demonstration in Ohio brings our old friend Samuel Groenendyke McMeen back into the spotlight. Since Mr. McMeen acquired the habit of being president of large corporations he has held consistly to that rule. So "Mack" is president of the Ohio State Telephone Company, which is one of the strong indications that it will become a business factor of high degree. Mr. McMeen has had thirty years of telephone experience. During these later years his prominent identification with the industry was the designing and construction of the independent telephone system for San Francisco. It is understood that he will continue at the head of the Columbus Railway, Power & Light Company.

* * *

As a result of this big Ohio merger of independent telephone properties, there will be immediate activity for new business and ample funds to care for plant extensions. During the period of Morgan ownership, these Ohio properties have been lying comparatively idle. No money has been spent on them that hasn't been earned in operation. Cuyahoga has proved that a company can thrive after the lid has been clamped on. It has reduced its capital account nearly half a million dollars, has shown constant growth and has made steady advances in gross and net earnings. Here is an example of the second telephone system in our sixth city—which offers the kind of competition that is appreciated by the public.

* * *

And as further evidence that Ohio independents are in deadly earnest, Harrison B. McGraw withdrew his complaints against the several telephone operators in Cleveland and without explanation. It will be remembered that Mr. McGraw wanted to snake a nigger out of a woodpile, alleging collusion between the Bell and Morgan telephone interests.

* * *

A little while ago, the vice-president of the central group of Bell telephone companies, Mr. Alonzo Burt, issued a pamphlet entitled, "Waste Nothing." There was a sub-title, "Small Economies as Profit Makers." It has been a long time since anything like it has appeared. Telephone employes are given a graphic account of what constitutes waste and it doesn't matter whether the employe is Bell or not. Alonzo Burt is the type of man who believes that large corporations are necessary and that an employe of a large corporation who indulges in extravagance at his employer's expense, is the wrong person to have around. There are thirty-five thousand employes in the Bell's central group. The average waste of a nickel a day would sum up $1,750. To save the nickel a day, therefore, becomes vital. Injured blow torches, examples of careless packing, waste of aerial cable, waste of guy wire, bad judgment in placing terminal boxes, and other flagrant illustrations are shown which offer object lessons to shiftlessly inclined workmen.

* * *

When you get it in the Boston News Bureau, it is apt to smack of A. T. & T. Co. I have seldom read an item having the telephone as subject matter that didn't leave the impression that it came fresh from a Bell dopester. An excuse was offered a little while ago that now the Bell having agreed with the department of justice, not to buy any more "dilapidated or semi-worn-out independent properties," it would require no outside money for future financing. If "saving first" becomes a Bell slogan, I want this dopester saved for me. Outside money has been required in the past, I take it, to buy the ramshackle independent systems! Mr. Vail's annual report never gave us that idea.

* * *

I haven't had a peep from Thaddeus S. Lane for ever and ever so long, and I'm hoping that no news at all is good news. If we could have Lane's inside story it would fill the third shelf in our book case, providing the text was confined to small type. When it's all over, there will be some telephones on the map that will recognize Thaddeus Lane as their godfather.

* * *

But the telephone isn't seeking the promoter, nowadays. It is getting on famously without the inducement of bonus of any kind. The telephone habit is the one thing that is unaffected by close times or war scares. We go right along including it in our plans in a larger, rather than a smaller way.

* * *

For hot weather reading we plan to show you how active the telephone business is, disregarding outward appearances. Everybody in the business is alive except, possibly, the men who write the ad copy for telephone trade journals.

* * *

One of these latter has only recently said: "The name ..... bears the same relation to telephones as Steinway does to pianos; Pullman to sleeping cars, etc." Criticism: "The name ..... will bear the same name, etc." No cost for the suggestion.

Dr. C. M. Sheldon Telephones a Speech

Fifty-two miles from his audience, Dr. Chas. M. Sheldon sat in the private office of the Topeka Bell telephone office and delivered a speech to the 250 members of the State Editorial Association in Manhattan. The speaker's words could be heard by the entire audience just the same as if he had been standing on the platform where stood the specially arranged megaphone instrument through which the speech was transmitted. The mouthpiece through which Dr. Sheldon talked is a special plan and the current is governed by lights which indicate the exact moderation of the voice. The room at the Elks Club in which the Kansas editors were assembled is 40x60 feet and a number of persons who stood in the hallway heard every word distinctly.

This was the first time a long distance speech has been made of this nature in Topeka and the effort was highly successful. The editors applauded at the close of the address and commended Dr. Sheldon for his unusual effort.

Recent Installations of Railway Telephones

The Progress of the Last Few Months in the Use of Telephone Dispatching

THE increasing use of the telephone system of train dispatching by leading railroads of this country and Canada is conclusive proof of its worth. Quickness, the personal relationship factor, and absolute dependability have, for the most part, been responsible for the adoption of the telephone for use in dispatching trains. The past five years have witnessed a gradual but steady change—the abandonment of the time-honored telegraph and the adoption of telephone equipment.

The telephone greatly simplifies the complex business of the train dispatcher. As a servant the telephone is always ready; as a saver of time and energy it has no equal. Experts agree that it makes for safer, more reliable and more efficient railroading.

Through the agency of the telephone discipline is enforced and efficiency increased. When a towerman comes under direct personal supervision of his chief by telephone he is more apt to carry out his orders with care and dispatch than if they are ticked in by the more or less impersonal telegraph sounder. Incidentally, the dispatcher can increase his range of operation by as much as 50 per cent.

In fact, the entire work of train dispatching has been reduced to a simple but definite conversation over the telephone. For example, there is the 80-mile circuit on the Western Maryland Railroad between Hagerstown and Cumberland. While this road does not handle many first-class passenger trains a day the dispatcher has his hands full maneuvering loose engines and freight trains. 1,000 minutes out of the 1,440 in a day his wire is busy with orders governing the movement of approximately 200 trains which come in and go out over one track. An average train order is given in two or three minutes, then he must answer about 1,600 reports of trains passing way-stations and by the time he has attended to the miscellaneous calls that are bound to come up each day he has done about all that it is possible for one man to do. With fifteen Western Electric way-station equipments and thirty siding telephones in use the entire line is in constant touch with the dispatcher at the terminal.

The Butte, Anaconda and Pacific Railroad Company, an ore carrying road, operating between Butte and Anaconda, Montana, has installed a telephone dispatching system to cover 76 miles of its line. While the trains for the most part are used to haul copper ore from the mines at Butte to the smelter at Anaconda this railroad company operates several passenger trains each day over the same tracks. The trains are run by electric locomotives entirely, a large water power plant at Great Falls being utilized to generate electric current. The dispatcher is located at Anaconda and is in communication with thirteen stations on the system. Thirteen locomotives are equipped with telephones, with jack boxes so placed on the outside of the engine cab that connections can be easily made to the overhead wires by line poles. This road has an unusually fine system of overhead construction in its electrical plant,, using a No. 10 B. & S. gauge copper circuit for the telephone line, although it is only forty miles in length.

Twenty-nine way-stations of the Chicago & Alton, between Bloomington and Chicago, and thirty-two way-stations between Bloomington and St. Louis, will be connected by the latest type of Western Electric selector equipment. The dispatchers for both circuits will be located at Bloomington, Ill.

In addition to these the Western Electric Company reports the following installations:

The Monroe, N. C., division of the Seaboard Air Line has put into commission within the past few months a system of telephone dispatching to extend over 282 miles. Selectors have been installed at thirty-eight way-stations. About the same number of siding sets have been placed at various points along the line for the use of trainmen.

On the Saint Louis Southwestern, from Illmo, Mo., to Jonesboro, Arkansas, about 136 miles have been equipped with 24 selectors and telephone equipment. The dispatcher is located at Illmo.

The Pittsburgh, Shawmut & Northern have extended the 47-mile circuit between St. Mary's and Brookville 53 miles by the equipping of 12 additional way stations to take the telephone line which is now complete to Kittanning.

The Chicago, Milwaukee and St. Paul Railroad Company is preparing for the installation of selectors on a circuit to cover a new division now in the process of construction between Great Falls, Montana, and Lewiston, a distance of 137 miles. The number of way station selectors to be equipped at present is fifteen.

The Southern Electric Development Company of Saginaw, Michigan, is installing a train dispatching circuit consisting of a dispatcher and nine way stations. This circuit is exclusively for the control of train movements. There is also to be a commercial circuit, consisting of 38 No. 1317 type telephones. This is for the handling of commercial business from various offices along the line. Both circuits are 57 miles in length, with the dispatcher's office located about midway in the circuit, at Saginaw. The commercial circuit goes into a Western Electric No. 1800 sectional unit type switchboard at Saginaw, being divided there at the north and south ends of the circuit. A notable feature of this installation is the use of 3,000 feet of submarine cable in Saginaw, the city ordinance not permitting the erection of poles. This submarine cable will run along the bed of the Saginaw river within the town proper, forming the north end of the train dispatching circuit.

The Cedar Rapids and Iowa City Railway Company has installed a telephone train dispatching circuit between Marion and Iowa City, with the train dispatcher's office at Cedar Rapids. The circuit has fourteen selectors; eight distributed on the south end, two in Cedar Rapids in the general office and four between Cedar Rapids and Marion.

The New York, New Haven and Hartford Railroad is using telephone train dispatching equipment on a line between New Haven, Connecticut and Springfield, Massachusetts. The distance covered is 60 miles, with the dispatcher located at New Haven.

The Northern Pacific has equipped the line between St. Paul and Staples, a distance of 142 miles, with train and message circuits. Both lines are arranged for simplex telegraph service. The dispatcher is located at St. Paul. Western Electric No. 386 telephone jack boxes have also been installed by the road.

The Denver and Rio Grande is now using two circuits, one from Salt Lake City to Helper, 152 miles, and another from Helper to Grand Junction, 177 miles. Dispatching stations are at Salt Lake City and Helper. Both a train and message wires run from Salt Lake City to Helper, but only a train wire is in operation from Helper to Grand Junction. On the last mentioned circuit 42 No. 102 type selectors and the necessary telephone apparatus are in commission. Fifteen selectors of the same type are used on the circuit to Grand Junction.

The Cleveland, Cincinnati, Chicago and St. Louis (Big Four) will install 70 No. 102-C selectors and equipment over two dispatching circuits. One line is to extend from Kankakee to Indianapolis, covering 144 miles, while the other, from Indianapolis to Springfield, is of about the same distance. The dispatcher is to be located at Indianapolis.

The main line of the Alabama, Tennessee and Northern will, within a short time, put into operation 9 No. 102-B selectors over the line between York and Reform. Seventy-three miles of road will be included in the circuit, with the dispatcher at York, Alabama.

Engineering Societies Consolidate

At the annual meeting of the American Institute of Electrical Engineers, a paper was read and discussion took place on the subject on combining the membership, or parts thereof, of the great national engineering societies in one association.

The primary object might be sufficiently and plainly described as "To foster and develop the human factor in the engineering profession, to place the engineer on the same plane as the lawyer and doctor," "for the discussion on engineering in general . . . except scientific and technical subjects . . ."

There was no adverse discussion and both paper and discussion show beyond doubt that even the leading members of the great national societies, whose objects are to advance science and engineering, realize that something more is needed. What they realize may be stated in this way:

(1) An organization separate from those of a scientific character is essential to develop the standing of the engineer as a social unit.

(2) There is no "adjectival" distinction between engineers when their interests in society are to be protected or advanced. At such a time architectural, civil, electrical, mechanical and mining men stand as a unit.

It will probably take much time to develop a scheme which will appeal to the members of four or five different bodies so large in numbers and pregnant with tradition as our national engineering societies, but in the meantime it cannot fail to be of interest to the profession at large to know that younger bodies are leaving the slow and heavy methods of debates to their elders and are, fittingly, up and doing.

The most important consolidation of societies which has taken place in the history of American engineering has just been effected by an order of the Supreme Court of the state of New York, which has merged the Technical League of Engineers and the American Society of Engineer Draftsmen, both incorporated bodies, into a new organization, to be known as the Technical League of America. The name was adopted because it includes architecture and every branch of engineering as well as every grade of worker in all those branches, from engineer-in-chief to tracer or technical student.

These two societies, though comparatively young, have done splendid work; the Technical League of Engineers among civil service departments and the American Society of Engineer Draftsmen in commercial fields.

This consolidation is the result of a thorough and comprehensive study of every phase of the question of placing the engineering profession on a higher social plane and obtaining for the engineer and his assistants that recognition, both economic and social, which is due to men through whose untiring efforts almost every possible safeguard for human health and every device for the higher development of the human race is conceived and perfected.

The experiences of the two organizations were analyzed; the tenor of opinions expressed in the technical press were studied and weighed together with papers, discussions and addresses made before other engineering societies. Committees of these two progressive bodies came together and after careful consideration of all the facts, unanimously endorsed the following significant pronouncement:—In advancing the economic and social status of the engineer—

No discrimination can be exercised against any branch of architecture or engineering or any subdivision thereof.

No discrimination can be exercised against any grade of engineer or assistant which the necessities of the profession has brought or may bring into existence.

No discrimination can be exercised on account of geographical location.

As surely as the tracer becomes the draftsman, the draftsman the designer, the designer the engineer or superintendent, so surely are the interests of each linked together in a chain which binds every unit in the profession, be he in government or private employment, and an injury or an injustice to one is a menace and a threat to all.

No other consideration was permitted to enter these debates than the highest welfare of the whole profession. It was recognized that the science of engineering in the immensity of the proportions it has now assumed, can best be advanced by specialization and, therefore, members of the league who have reached the higher grades and passed beyond the trials and struggles of the lower ones, will be urged to join the national society representing the branch to which they belong, retaining, however, their membership in the league.

The league, on the other hand, cordially invites those members of existing national societies who believe in advancing the status of the engineer through the medium of legislation and organized effort to send in their applications to the league forthwith, without prejudice to their present affiliation. The league most heartily extends this invitation also to the members of other state and local societies and particularly to that great body of men in the profession, of all grades, who belong to no organization but who have been waiting for the advent of the Technical League of America.

The employe is prone to forget that in giving his services he is simply selling goods. And he can't skip out after a sale like a patent medicine agent; his customer is right there to see that he gets good value for his money.

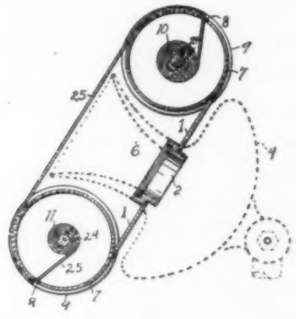
Recent Telephone Patents

A Brief Digest of those Current Specifications Most Interesting to Telephone Men

BY DAVID S. HULFISH

U. S. PATENT No. 1,068,627. To W. W. Bythiner, Philadelphia, Penna., assignor of part to E. D. Bernheim, Philadelphia, Penna. The device is for mechanically locking the receiver against unauthorized use, and comprises a plate for covering the larger end of the receiver, the plate being provided with hooks to engage the receiver, and with a lock and key for releasing the hooks.

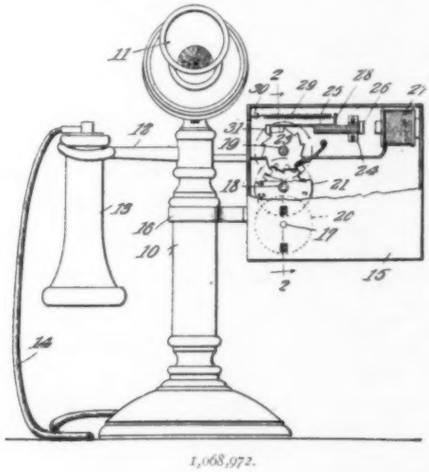
1,068,640 and 1,068,641. For Storage Cell. To Bruce Ford, Philadelphia, Penna. The lead element of the cell is composed of a ribbed lead tape rolled into button form. The grid carries insulation projections upon it.



1,068,949.

1,068,871. For Cooling Telephone Transmitters. C. E. Egner, Stockholm, and J. G. Holmstrom, Saltsjo-Storangen, Sweden. In telephone transmitters used for repeating or relaying speech currents, and in transmitters for loud-speaking work, exceptionally heavy currents are used, resulting in considerable heat. In this patent, a heat absorbing body is placed at the carbon button of the transmitter.

1,068,949. For Disinfectant Attachment for Telephone Transmitters. To Joseph Tichy, Chicago, Ill. A housing is attached to the face of the transmitter, with two rollers, one carrying a roll of paper and the other being a take-up roll which draws the paper across the mouthpiece of the transmitter.



1,068,972.

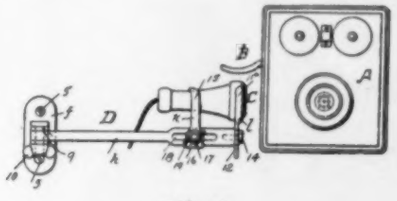
1,068,972. For a Register for Telephone Calls. To Henry S. Brewington, Baltimore, Md. The register is attached at the subscriber's telephone in such way that when the receiver is lifted the register magnet is placed in shunt of the bell coils, the register and call bell being then both in series with the condenser. By ringing upon the line when the receiver is off the hook, the register is actuated to record a call and the subscriber is notified by the ringing of the bell that the call is being recorded. Ringing the bell when receiver is not off hook does not operate register.

1,069,307. For a Receiver Holder. To Andrew Wetzel, Los Angeles, Calif. A bracket is screwed to the wall and from the bracket a swinging arm holds the receiver so that the telephone user may press the ear against the receiver without the use of the hand to hold the receiver while using the telephone.

1,069,458. For a Telephone Lockout for Party Line Telephones. To Walter A. Morse, North Grovenor Dale, Conn. A lockout magnet is provided at each telephone of a party line, and a circuit is provided having all of the lockout magnets of the line in series. A battery is provided at each station and any station may operate a switch to include its battery in the lockout circuit, thereby locking out all stations whose receivers have not been lifted prior to the application of the controlling battery. The controlling battery is applied automatically by the act of lifting the receiver of the calling station, except when the called station is upon the same line.

1,069,811. For Telephone Apparatus for Trains. To Percy Robinson, Sudbury, Ontario, Canada. The car carries a fixed telephone set and a flexible cord for connecting to line wires beside the track. The invention of the patent is found in the design of drum for winding up or paying out the flexible connecting cord without severing the connections between the cord terminals and the telephone.

1,069,899. For a Microphone. To Guillaume A. Nussbaum, London, England. The microphone or carbon cell is designed to magnify the effect of the movement of the diaphragm upon the carbon granules. Between the vibrating diaphragm electrode and the fixed back electrode is placed a pneumatic rubber



1,069,307.

ring surrounded by a rigid ring, but free to expand inwardly when compressed by the diaphragm. The movement of the diaphragm therefore not only compresses the carbon granules within the ring by reason of the movement of the electrodes toward each other, but further compresses the granules by the inward movement of the compressed pneumatic ring.

1,070,104. For a Telephone System. To G. A. Betulander, Saltsjo-Nacka, Sweden. The system shown is in connection with the "Betulander" system of automatic telephone switching, and this patent covers a method dealing with leaky lines. The central office battery is connected to such a line periodically and is disconnected subsequently under the action of a time-limit device.

1,070,291. For a Lock for Desk Telephones. To C. D. Rhinehart and Lubomir P. Saponoff, New York, N. Y., Saponoff assignor to Thomas McGonigal, Brooklyn, N. Y. A hinged collar surrounds the column of the desk set just above the hook lever, and a lock mechanism is built in the collar. The collar is unlocked and removed while the telephone is in service.

1,070,505. For a Signal System. To John H. Mattice, Clyde, Kan. The system is for a telephone party line. A battery and a rheostat arrangement at the central office permits only a predetermined measured amount of current to flow over the telephone line when a station is to be called, the amount of current being different for the different stations. Magnets at the several stations are so adjusted that stations adjusted for weaker currents than the current sent will have two magnets operated and stations adjusted for stronger currents than the current sent will not have any magnet operated, while the station adjusted for the current sent will have one magnet operated and another not, and thereby will ring its signal bell.

1,071,207. For a Telephone System. To E. R. Corwin and C. A. Bals, Chicago, Ill., assignors to Corwin Telephone Manu-

facturing Company, Chicago, Ill. (Application filed September 17, 1908.) The improvement is in the cord circuit provided with a ringing relay and an interrupter for operating the ringing relay for periodic ringing until the telephone responds to the call.

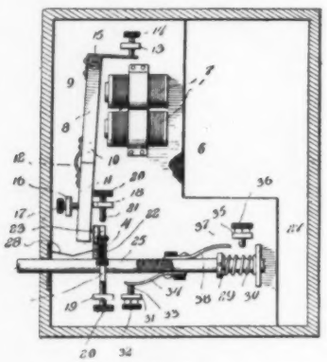
1,071,208. For a Telephone System. To E. R. Corwin, Chicago, Ill., assignor to Corwin Telephone Manufacturing Company, Chicago, Ill. (Application filed October 12, 1908.) The connecting cord pair has a "listening relay" instead of a "listening key." The relay connects the operator's telephone set to the cord pair when the answering plug is inserted and disconnects it when the ringing plug is inserted.

1,071,209. For a Telephone System. To E. R. Corwin, Chicago, Ill., assignor to Corwin Telephone Manufacturing Company, Chicago, Ill. The cord circuit has no signals and the line relay and line lamp are so arranged with contact points in the line jack that the line lamp serves as a calling signal when the jack is not plugged and as a clearing signal when the jack is plugged. Pilot signals and relays are operated separately for the calling and clearing services, separate pilot lamps being provided.

1,071,210. For a Telephone System. To E. R. Corwin, Chicago, Ill., assignor to Corwin Telephone Manufacturing Company, Chicago, Ill. A private branch switchboard arrangement, having trunks to a main public central office, and having special signals at the private branch attendant's station to guard against interruption of a trunk connection.

1,071,211. For a Telephone System. To E. R. Corwin, Chicago, Ill., assignor to Corwin Telephone Manufacturing Company, Chicago, Ill. A system for private branch exchange having trunks to an automatic public central office. Means are provided to prevent accidental severing of a trunk line from a calling station.

1,071,212. For a Telephone System. To E. R. Corwin, Chicago, Ill., assignor to Corwin Telephone Manufacturing Company, Chicago, Ill. A busy test circuit for an intercommunicating system.



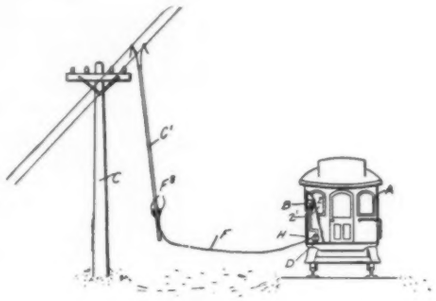
1,069,458.

1,071,279. For Protective Device. To H. R. Van Deventer, Sumter, S. C. The novelty in this lightning arrestor is found in the shape of one of the sparking members, which has its main body supported at a considerable distance from the earth plate, and has points extending toward the earth plate to within striking distance.

1,071,292. For a Lockout Telephone for Party Lines. To Elhanan Bowman, Elmwood, Ontario, Canada, assignor of one-half to C. R. Miller, Berlin, Ontario, Can. While a magneto telephone is shown, the apparatus is applicable to common battery exchange lines. The hook lever is given a long swing and carries a slider which passes near a testing magnet core, and is associated with switching springs. The slider, if not attracted by the magnet core, will connect the speech elements of the telephone to the live wires, while the hook remains up, but if attracted by the magnet while moving it is pulled away from its ordinary course and moves into a position where it does not connect the telephone to the line, the telephone therefore remaining "locked out." The start of the movement of the hook lever connects the test magnet to the line wires and the finish connects a battery to the line to charge other test magnets.

1,071,588. For a System of Electrical Selection and Control. To C. E. Scribner, Jericho, Vt., J. L. McQuarrie, Montclair, N. J., and E. B. Craft, Hackensack, N. J., assignors to Western Electric Company, New York, N. Y. (Application filed March 12, 1910.) Upon a party line, a step-by-step selector is arranged to be advanced through a preliminary range of selection by control of current of one character and through a further range of selection by current in reverse direction, with means for preventing the first advance from being more than preliminary to the second.

1,071,601. For a Telephone Set. To W. O. Beck, Ridgefield, N. J., assignor to Western Electric Company, New York, N. Y. This patent covers a specific means for mounting a writing shelf upon a wall telephone set.



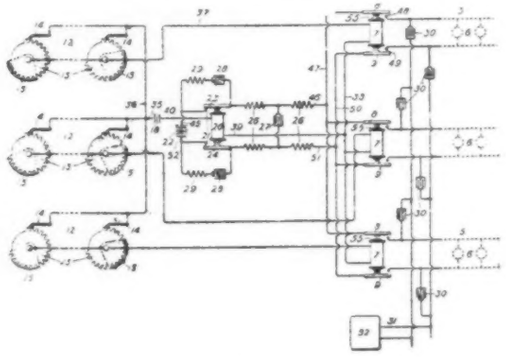
1,069,811.

1,071,652. For a Signaling System for Party Lines. To Richard F. Spamer, New York, N. Y., assignor to Western Electric Company, New York, N. Y. Where signals are to be sent from a central station over several lines, a signal sender is provided for each of the lines, all of the lines and all of the call senders operating to a single impulse generator.

1,072,400. For an Automatic Battery Cutout for Substation Telephones. To Anton R. Nelson, Janesville, Calif. The object of this invention is to reduce the annoyance to the parties to a telephone conversation using a party line in case a receiver at another station should be lifted. When the receiver is lifted in the telephone of this patent, the receiver circuit is closed so that the telephone user may listen upon the party line to learn whether the line is in use, but the transmitter battery circuit is not closed. Finding the line not in use and turning the generator crank to send a signal, the turning of the crank causes the closing of the transmitter battery circuit. Thus had the line been busy the lifting of the receiver would not have caused any annoyance, since with the transmitter battery circuit open the listening telephone would have been electrically silent.

1,072,459. For a Substation Selective Apparatus. To Oscar B. Hjorth, Sandwich, Ill. A stepping device having ringing and restoring magnets and circuits whereby the operation of the ringing magnet is followed automatically by the operation of the restoring magnet.

1,072,513. For an Attachment for Transmitters. To E. M. Schollenberger, Chicago, Ill., assignor of part to L. A. Stahl, Chicago, Ill. A voice shield for transmitter, that the noise of the



1,070,104.

room may not reach the transmitter, nor the voice of the speaker be heard in the room.

1,072,537. For an Attachment for Transmitters. C. S. Warren, Milford, O. The effort of the inventor is to avoid infection among the users of the telephone. To this end he provides a separate mouthpiece for each user. A ring clamps the transmitter case and several mouthpieces are so hinged to the ring

that any one of them (but not more than one) may be swung into position in front of the transmitter.

1,073,018. For a Railway Telephone System. To W. J. Bailey, Cedarville, W. Va. A conductor is installed beside the track and the telephone and signaling circuit is from car to station telephone over the conductor and the track rails. A further signal circuit for emergency use is formed from the track rails to the earth, independently of the usual signal circuit.

1,073,589. For a Telephone System. To S. H. Browne, Pittsburgh, Pa., assignor to American Telephone & Telegraph Company, New York. (Application filed August 29, 1904.) A call-distributing system for a manual switchboard by which an automatic switch for each line is used for passing a call originating upon the line to the first available idle operator, or idle ringing-plug trunk circuit.

1,073,667. For a Transmitter. To H. C. Egerton, Passaic, N. J., assignor to Western Electric Company, New York, N. Y. The carbon cell is a double cell. Two front plates or frame plates are provided, each of which carries a cup and electrode, the diaphragm being held between them and carrying a double central electrode.

Progress in Long Distance Telephony

In a lecture delivered at the Royal Institution at London, April 4, Dr. J. A. Fleming, F. R. S., described the inventions which of late years have rendered possible a great increase in the distance of telephonic communication and have permitted the use of submarine telephone cables over distances previously impracticable.

The lecturer explained that in the case of a telephone wire the shorter the wave length the greater the velocity with which the waves travel, while the amplitude of the shorter waves attenuates to a greater extent than that of the longer ones.

Hence when, as a result of speaking to a telephone transmitter, a complex electromotive force is applied to the end of a cable, the various simple harmonic waves into which the impulse may be resolved travel along the cable with unequal speed and attenuation. The short waves travel fastest, but are worn out soonest. Hence the wave form is distorted.

A remedy for the distortion of articulate sounds was first suggested by Oliver Heavyside, who showed mathematically twenty-five years ago how waves of all lengths could be made to travel at the same speed and attenuate at the same rate.

An important advance was made by Professor Pupin of Columbia College, New York, in 1899 and 1900, when he proved that Heavyside's suggestion can be put into practical form by loading the cable with coils of wire wound on iron wire cores, inserted at equal intervals, but so close that at least eight or nine coils are included in the distance of one wave length of the average wave frequency, which is always taken at 800.

If the coils are placed farther apart relatively to the wave length, they do more harm than good. Aerial lines, underground cables, and submarine cables, can all be treated in this way.

The longest aerial loaded line is that from New York to Denver, 2,000 miles. This line permits good speech between those places, and it is the ambition of the American Telephone and Telegraph Company to complete a loaded line that will render speech possible between New York and San Francisco, over 3,000 miles.

A line has just been completed between Berlin and Rome. It runs overhead, except through the Simplon tunnel, with loading coils at every eight miles, and good speech is possible over the whole distance.

In England the longest loaded lines are two trunk lines from London to Leeds, 200 miles. The general postoffice has now in operation 30,000 miles of aerial and underground loaded circuits, and 45,545 miles are in the course of being loaded.

As regards loaded submarine cables, the general post-office has three—one to France, twenty-one nautical miles long, one to Belgium, forty-eight miles, and one to Ireland, sixty-four miles. A fourth, which is now being manufactured, is to be laid from Suffolk to the nearest point in Holland, 125 miles. Loading has rendered it possible to double or more than double the distance of effective telephonic intercourse.

In wireless telephony, Dr. Fleming said the arrangements are closely similar to those employed in wireless telegraphy, but in the base of the antenna, or coupled to it, must be placed a microphone, by means of which the speaker's voice makes changes in the resistance of the antenna circuit, the result being to vary the amplitude of the waves emitted without altering their wave length.

The difficulty is to obtain a microphone that will carry large high frequency currents. By the aid of an ingenious liquid microphone Professor Vanni of Rome has transmitted speech for 625 miles. Fessenden in the United States has telephoned a few hundred miles, and Poulsen in Denmark, Colin and Jeance in France, Goldschmidt in Germany, and Ditcham in England have covered greater or less distances.

Marconi recently carried out demonstration with wireless telephony for the Italian navy.

The lecturer concluded by remarking that we are yet a long way from telephony across the Atlantic, whether with cables or by wireless, but progress will continue to be made, and it is possible that some day speech transmission from England to San Francisco with one repetition at New York may be an accomplished fact.

Government and Private Ownership in Italy

Under an act of the Italian Parliament July 15, 1907, the telephone service in the larger cities of Italy was taken over by the government through the purchase of the plants of the largest two operating companies. Several smaller companies were allowed to continue operations for ten years before being taken over by the government and in 1913 the term was extended in some instances for ten years longer.

The government operates the principal long distance lines and has exchanges in 69 cities. On June 30, 1911, the number of government subscribers was 51,828 and of subscribers to private lines 24,233. The number of government subscribers in the principal cities on June 30, 1911, was as follows: Milan, 11,207; Rome, 10,025; Genoa, 5,783; Turin, 5,050; Naples, 3,671; Florence, 3,347; Venice, 2,045; Bologna, 1,628; Palermo, 1,293; There are ten principal concessionaire companies.

The exchange equipment of the Milan central office is of two kinds, the common battery multiple switchboard of vertical type and the magneto multiple board of horizontal type. The former was manufactured by an American and the latter by a German company. There are no manufacturers of telephone equipment in Milan.

The American consul at St. John's, Newfoundland, has forwarded a newspaper clipping showing that the Government of Newfoundland is desirous of having an up-to-date telephone service established in the city of St. John's. Correspondence is desired with companies willing to install and operate such a plant. Further information can be obtained by addressing T. A. Hall, Government Engineer, St. John's.

Wants More Green Cord for Telephones

If the results which Councilman E. Merle Bixby, of Providence, R. I., hopes to accomplish are brought about, it will be possible for telephone users in Providence to talk to the world in their sleep if they so desire. That is, the telephone instrument can be brought right to their bedside, and it is for them to decide whether they will be awake or asleep when they talk.

Under present conditions, Mr. Bixby claims, the company allows the subscriber only six feet of cord for a desk telephone, and this amount, while being enough to hang oneself, is not sufficient for other purposes. His resolution would provide for a cord long enough so that the instrument may be moved from one room to another, and would, he believes, result in much saving of time in answering calls.

Mr. Bixby wants the telephone company to allow each subscriber as much cord as he desires, without any extra charge to the subscriber. His resolution will be referred to the special committee on telephone franchises. It is as follows:

Resolved, That the joint special committee relative to telephone franchises be authorized to confer with the officials of the Providence Telephone Company for the purpose of securing from that company an agreement that telephone subscribers shall be allowed to have connected to their telephone instruments such lengths of cord, without cost to the subscriber, as said subscriber in his judgment may deem sufficient for the use of the telephone instrument in his house.

An agreement similar in nature to the one Mr. Bixby proposes has just been reached between the city of Boston and the telephone company there, and is to become effective at once.

Telephone Alarm Clocks

The Duluth (Minnesota) Telephone Company made a formal announcement the other day that it would, contrary to the rules of most telephone companies, continue to accommodate its subscribers by acting as an alarm clock, meaning that when asked to do so central will ring up a subscriber in the morning and tell him it is time to get up.

Manager F. E. Reif of the Houghton telephone system says that the Duluth company is creating no innovation, that in Houghton the practice is one that is time honored and so much a respected tradition that it would be akin to a revolution if it were stopped.

It is the ordinary task of the Houghton central girl on the night watch to ring up early risers. Some of the subscribers look upon this matutinal attention as a part of the service paid for and are called regularly every morning. They may be doing it to save money on an alarm clock or they may consider that the telephone is more effective. In any event the telephone alarm is a big benison they demand from the company.

Installers Find a Way

Will H. Connette and Russel Weybright, combination installers in South division, Chicago, claim to be the inventors of a new method to be used in installation work. Certainly the expedient they employed to overcome an unexpected difficulty encountered in their work deserves to rank with the celebrated "ferret" stunt, with which underground conduit men were wont to astonish the credulous in the "old days," says the *Bell Telephone News*.

The two had a line to run from the first to the third floor of a large house on Ellis avenue. The house was provided with a conduit for telephone wires, but the outlet boxes were located in such a way that there were four bends. The men first tried pushing a steel fish tape first from one box, then the other, but were unable to get past a point on the second floor. They kept up the ineffectual work for several hours. Finally Mr. Connette bethought himself of the vacuum cleaning apparatus in the basement. They started the machine, then took the large hose to the third floor. After splicing on a piece of garden hose, which was small enough to be inserted in the cut-out box, they placed the end over the opening in the conduit. Then they tied a string to a piece of paper and stuck it into the other end of the conduit. It went through like a shot, carrying the string, and the problem was solved.

English Service

A referendum was recently instituted in the city of London by the Parliamentary Telephone Committee; 1,500 question forms were sent out, of which nearly half were returned. In reply to a question whether the local service had deteriorated since the transfer to the postoffice, says the *Standard*, 50 per cent said "Yes," 11 per cent "Deteriorated, but now better," 29 per cent indicated "No change," and 10 per cent "Improved."

Thirty-eight per cent said that their lines and instruments were frequently out of order, but 62 per cent replied "Not often." Similarly, 36 per cent experienced frequent difficulty in getting through to the exchange, but 64 per cent did not. As to trouble in getting through to subscribers on other exchanges, 33 per cent reported "No difficulty," 19 per cent "Not often," and 48 per cent "Frequent trouble." A considerable majority of replies indicated that wrong numbers were often given. To the question: "Do you frequently get cut off in the middle of a conversation?" the replies "Yes" and "Very frequently" proportioned 65 per cent, "Occasionally" 21 per cent, and "No" 14 per cent. As to the "no reply" grievance in business hours, "Frequently" and "Very frequently" were the answers to the question of 52 per cent; "Occasionally" and "No" represented the other 48 per cent.

With regard to being rung up in mistake, 70 per cent replied "Frequently." Fifty-nine per cent had no trouble in calling the operator's attention in such circumstances. When trying to obtain a clear line after a conversation, in order to give a fresh number, 59 per cent are generally successful, but 19 per cent report that there is "Sometimes difficulty." Forty-six per cent have "Difficulty" or "Very great difficulty" in securing the operator's attention, after failing to obtain an answer to a number asked for. Sixty-three per cent state that the authorities pay prompt attention to complaints and removal of faults. Of the remainder, 27 per cent say "No" and 10 per cent state that they "Get attention, but no improvement." Seventy per cent say that the practice as regards subscribers' contracts and accounts is unsatisfactory.

The trunk service is considered satisfactory by 78 per cent, but 73 per cent say that the charges are "Unreasonable" and "Excessive."

To the question, "In your view, is it more important that the telephone service should be highly efficient or that the rates should be reduced?" 73 per cent reply: "Efficient service;" 20 per cent hedge with "Efficient, but rates reduced," while the remaining 7 per cent ask for reduced rates. "Is it your experience that a large proportion of your daily calls are ineffective?" To this 52 per cent replied "No," 42 per cent "Yes" and 6 per cent "Very many."

Of Interest to the Trade

What the Telephone and Accessory Manufacturers Are Doing to Advance the Art

Kellogg's Convention Exhibit

Some interesting features of the latest Kellogg equipment were exhibited, and aroused much interest, judging by the crowds of visitors, at the Missouri-Kansas convention last week at the Sexton hotel, Kansas City. The first thing to be noted on entering the room was a large sign above a neat, spick and span switchboard, reading: "The second best board in the world is an old Kellogg tuned up. They never wear out." This board, Mr. Faris, manager of the Kansas City office said, has just finished twelve consecutive years of hard service and "had been sold to begin another 12-year record."

H. N. Faris, Kansas City Manager.

Herbert Clark.

H. A. White.

J. H. Martin.

Although the board looked practically brand new and could hardly be picked out, so far as the cabinet and apparatus went from the other boards in the room, all that had been done was the addition of some new jack thimbles, a few springs, lacquer on the shutters and a coat of varnish; after a thorough cleaning.

On the demonstration panels were shown the Kellogg direct harmonic system wall sets illustrating, among other advantages, how four telephones can be operated selectively on a metallic circuit with no grounds at subscriber's station or at central office, four telephones can be operated selectively on a one-wire grounded line or eight telephones can be operated selectively on a full metallic circuit by bringing four bells from each side of line to ground. The subscriber calls central and "rings off" without disturbing any bells on the line. Neither can any bell on the selective line be disturbed by a ring coming from any connected line. "Central" is the only person who can ring a bell on any selective line, and it is impossible for her to ring more than one party on any selective line at a time.

The sets receiving the most attention, perhaps, were the new Kellogg universal type instruments. It was the general opinion of all who saw these telephones that they are a most sensible design of magneto telephone, and every improvement experience could reveal has been incorporatd. For instance, the transmitter arm has been shortened one-half; an improved switch hook; the standard Kellogg transmitter, of the high resistance type giving increased talking efficiency with prolonged life for batteries. In the new set, which is reduced in size and depth, binding posts are placed inside the cabinet, doing away with the needless risk of short circuits and attendant troubles. The small size of these telephones renders them most suitable as convertible-to-common-battery sets and it is evident that this type is to be the standard equipment of the future.

Then for the managers of larger exchanges the wonderful compact universal board was an attraction. No man from beginner to veteran in the business could but be impressed with the tangible evidence of superiority in the demonstration of this wonderful Kellogg improvement, years ahead of the field.

There were connected to this board magneto and common battery sets, coming in on lamp signal lines, giving equally efficient service to either with a remarkably clear understanding possible from the operator's standpoint. She knows during every call everything about that call. Her supervision is prompt and accurate. This board having the most important advantage in that magneto subscribers can be changed as desired, one line at a time making an increase in rates and a betterment in service possible from the start and this, without change in the board or apparatus.

This universal board, while thoroughly tried in the test of actual long time service, is new to many. The company will be glad to give fullest details to those interested.

H. N. Faris, manager of Kansas City branch office, was in charge, assisted by H. A. White, Herbert Clark and J. H. Martin and Edward I. Pratt. Much interest was aroused in "subscribers' campaigns" by the Kellogg slide and plate advertising series.

An automobile enabled many visitors to inspect the Kellogg branch office and warehouse at 407 Broadway.

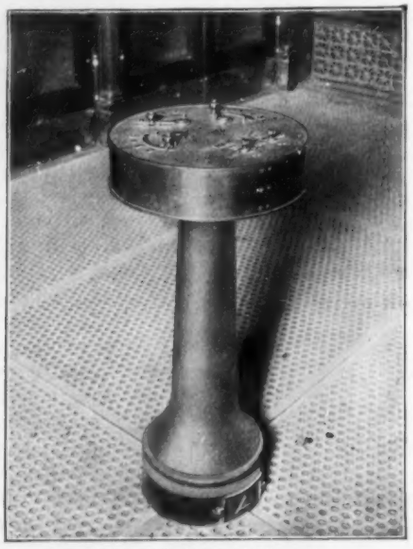
An Electric Vehicle Call

A new type of vehicle call has recently been installed in the department store of James McCreery & Co., New York, for the convenience of shoppers. The feature of the call is that it is operated from a special form of pedestal switchboard and not from a panel in the wall, as is generally the case with carriage calls.

The advantage of a pedestal form of switchboard is that it may be located in the center of the lobby, where it will be in plain view of customers going out of the

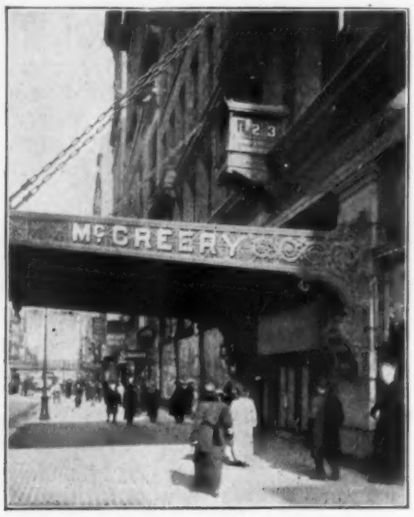
store. The wall type vehicle call was not considered for this installation, as it is usually a source of delay to shoppers on account of the difficulty experienced in finding it.

The method of operating the switchboard, which was designed by the Western Electric Company, is extremely simple. When shoppers drive up to the store they receive



The Pedestal Switchboard

a numbered check from the carriage man stationed at the curb. On leaving the store the check is surrendered to the switchboard man, who moves the switch levers on the dial face of the pedestal to numbers corresponding to those on the check. This causes the numbers to be reproduced electrically on both sides of the vehicle call annunciator on the outside of the building.



Calling the Vehicles

The chauffeur or driver, who has received a duplicate check upon arriving at the store, can see immediately that he is wanted, and drives to the entrance. If it is necessary to use the vehicle call after dark, another lever switch on the switchboard dial can be used to light a bank of lamps which will illuminate the numbers.

Although the pedestal switchboard vehicle call has been in use but a short time, it has already proven its value in the dispatch with which carriages and automobiles are moved and the satisfaction derived by the customers.

World Trade of the United States

A convenient reference book for the exporter or manufacturer who is interested in foreign trade is a Bulletin of Imports and Exports of Merchandise into and from the United States by Countries and Principal Articles, which has just been published by the Bureau of Foreign and Domestic Commerce and is sold by the Superintendent of Documents, Government Printing Office, Washington, D. C., for 15 cents a copy. A glance at this pamphlet affords the business man a bird's-eye view of the character and volume of our commerce with any foreign country, as it gives the quantity and value of its principal purchases from us and its sales to the United States for the years 1912 and 1913.

Statistics are not made use of currently by the average business man; but this pamphlet conveniently at hand on his desk, will answer at once many questions which arise in connection with international commerce. The material was formerly included as Table No. 19 in the large quarto annual volume "Commerce and Navigation of the United States," a costly and bulky publication available in a limited edition only. Issued in this convenient form it should take its place as a reference book essential to any business house with an interest in export and import trade. Where this book does not give sufficient detail, reference can, of course, be made to the more elaborate tables of imports and exports which are printed in "Commerce and Navigation."

The bureau hopes, by placing these statistical facts in more readily accessible form before the commercial public, to attract attention to the practical value of the many other similar tables of our foregn trade which are issued by the government in this field.

Stromberg-Carlson Company to Reorganize

The directors of the Stromberg-Carlson Telephone Company have worked out a plan of reorganization for that company which was submitted to the stockholders in a letter mailed on May 16. For the past two years the Stromberg Company has been reducing its preferred stock, having within that period paid off $1,125,000 principal and $428,700 accumulated dividends. The preferred stock issue has been reduced to $375,000, and the directors believe now to be an opportune time to effect such a reorganization as will insure the retirement of the balance and allow the holders of common stock to continue to operate the company.

The plan is for the present corporation to pay a further dividend of 5 per cent, amounting, all told, to $75,000, upon its preferred stock, and have the preferred stockholders then take notes of the successor Stromberg-Carlson Telephone Manufacturing Company for the balance. Holders of common stock have the privilege of exchanging their stock on a share for share basis for stock of the new company, the only difference being that the par value of the new corporation's stock will be $25.00 per share instead of $100.00.

If the reorganization plan is unanimously approved by June 10 it will immediately be put into effect. If it is not unanimously approved, but is approved by such proportion of the stockholders as indicates that it can be carried out if outsiders become interested or some of the

stockholders increase their interests, the directors will endeavor to make it effectual in that way. In that event all of the property will be sold at public auction on the 10th of July, and the directors will bid for the same in behalf of those who, whether stockholders or not, have become subscribers for the stock of the new corporation. If either one of these plans becomes effective the business will pass to a new corporation owned largely or entirely by the stockholders of the present company.

In case, however, the stockholders of the present corporation do not desire to continue their interests, the directors have a third plan for continuing the business as a going concern. They intend, should both of the plans outlined above fail, to sell all of the property of the present Stromberg-Carlson Telephone Manufacturing Company, with the exception of the securities which it owns, at public sale on the 15th of August. They state in the letter: "If we are forced to resort to this last method of selling the property at public auction, we shall use every effort to bring together a group of men who will bid for the property, with the intention, if they become purchasers, of continuing the business."

On March 31, 1914, the assets of the Stromberg-Carlson Telephone Manufacturing Company were as shown below. Outside of its current liabilities the company has no indebtedness.

Cash in bank		$110,775.41
Accounts receivable		167,281.41
Notes receivable		22,200.17
Merchandise		388,362.45
Departmental machinery		121,165.15
Departmental factory equipment		53,271.57
Tools		120,000.00
Patterns		5,000.00
Furniture and fixtures		16,881.20
		$1,004,936.36
Securities		395,829.42
Total		$1,400,765.78
Deduct—		
Current liabilities	$ 20,108.43	
Reserves for taxes, uncompleted contracts, etc.	17,637.88	
		37,746.31
Net book value of assets		$1,363,019.47

The company is doing a business of more than $1,600,000 per year, and is occupying 180,000 square feet of floor space in the plant at Rochester, New York, which it constructed in 1903, under a lease and renewal agreement running until January 1, 1919. It likewise maintains branch organizations at Chicago and at Toronto, Ontario, and stocks are likewise carried for the benefit of its Pacific Coast customers at San Francisco, Seattle and Los Angeles. The directors feel that if a new corporation is organized in one or other of the methods outlined above, the business can be profitably continued, and it is the earnest hope of independent telephone men in general that such will be the case.

Canadian Plant for Automatic Electric

Because of the large and growing demand for automatic telephone equipment in various sections of Canada, and also to comply with the patent laws of the Dominion, Automatic Electric Company of Chicago, maker of the automatic telephone apparatus, has incorporated an affiliated company known as the Automatic Telephone Manufacturing Company of Canada, Ltd., with a capital of $1,000,000, for the purpose of manufacturing and selling this type of equipment under patents owned by the parent firm.

The headquarters of the new company are in Winnipeg, where a factory is being equipped, which, it is expected, will begin operation by the middle of June. The building occupied by the Automatic Telephone Manufacturing Company of Canada is a modern four-story brick and stone structure, 50 by 100 feet ground area, located in the heart of the city and equipped with every device for the efficient carrying on of manufacturing operations, and especially well supplied with shipping facilities, a railway spur passing one side of the plant. C. J. Franke, long an employe of Automatic Electric Company, is in charge of the new factory.

At present six automatic telephone exchanges are in operation in the various provinces of Canada, being located in Calgary, Edmonton, Lethbridge, Regina, Saskatoon and Strathcona, and having in service an aggregate of 27,000 lines. All of these are owned by the provincial or municipal governments, and considerable additions and extensions are contemplated in the near future.

Automatic Telephone Manufacturing Company of Canada, Ltd., Has This Building at Winnipeg.

Rapid Restoration of Crippled Service

Two recent fires in telephone central offices—one in Worcester, Massachusetts, and the other in Canonsburg, Pennsylvania—and the subsequent rapid restoration of service to subscribers have served to give proof of what can be done by a well-equipped organization in time of emergency.

Telephone service was restored to nearly 19,000 sub-

scribers in a total period of less than nine days after the fire in the New England Telephone and Telegraph Company's office at Worcester in the early morning of Saturday, March 28. The flames worked their way into the intermediate distributing frame and before they were extinguished the entire city and several small suburban towns were without telephone service.

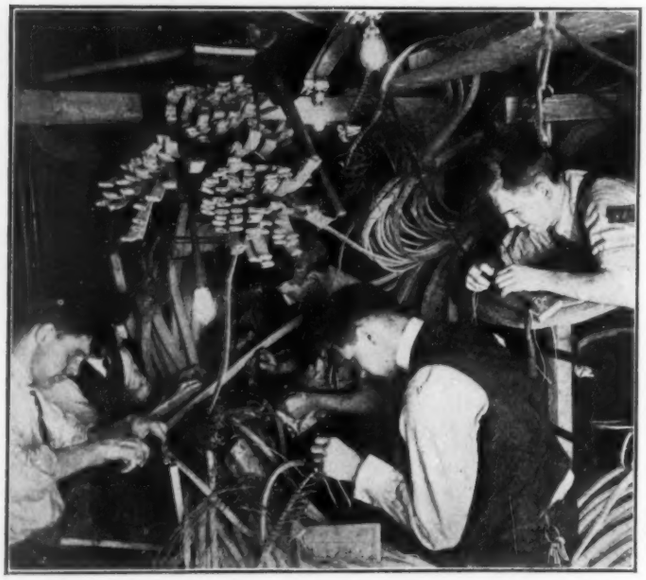
The telephone company sent its call for help to the home of the Western Electric Company's general foreman in Boston. He set the necessary wheels in motion, and within a few hours tons of material and scores of men were hurried into Worcester. The destroyed circuits were replaced and the damaged lines sorted out and reconnected at a rate which gave back service at the rate of 2,000 subscribers every 24 hours.

The wind-up came on Sunday, April 5, when at 9 p. m. the mayor of Worcester soldered in the last connection. The installing crews worked a total of 207 hours. During this period they placed in position 35,145 feet of cable of various styles, and 156,000 feet of three-stranded cross-connection wire.

The other record for the quick restoration of crippled telephone service was made at Canonsburg, Pennsylvania, after fire had destroyed the switchboard in the local Bell exchange there, putting nearly eleven hundred lines out of commission. Communication was completely cut off for about twenty hours.

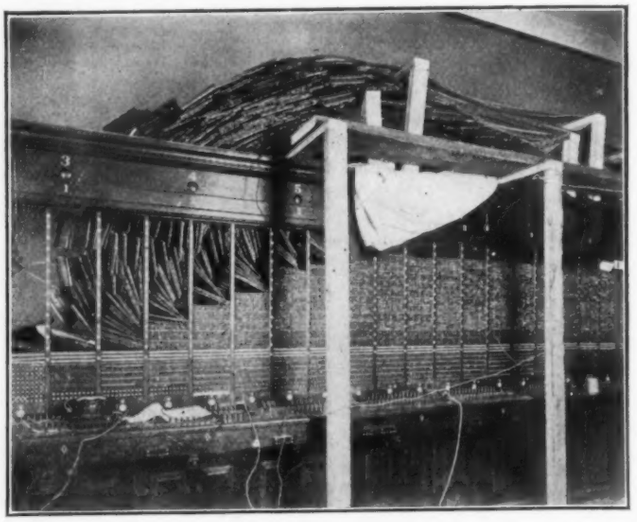
The fire broke out in the terminal room about 11 o'clock at night. The night operator was the only one on duty. She noticed the room filling with smoke and summoned the fire department. It was not until the store room and offices on the ground floor and the terminal room on the second had been pretty badly damaged by smoke and water that the flames were extinguished.

The Western Electric Company was called about 2:30 a. m. and material ordered for shipment from its Pittsburgh house. A special train carried five sections



Gang of Splicers at Work at Point of Greatest Congestion. Six Hundred Cables Spliced at This Point, Each Cable 192 Wires.

of a No. 102 switchboard to be used temporarily to handle the common battery subscribers and two magneto sections for the rural and toll lines. At 3 o'clock that afternoon the first subscriber's line was cut into the switchboard and the work was then soon completed. On the tests not a single case of trouble developed. This emergency switchboard took care of the traffic until new equipment was put into service ten days later.



First Section of Park Switchboard, Worcester, Mass., After the Fire. Seventeen Thousand Six Hundred Multiple Jacks and Their Cabling Turned Back to Locate Underlying Wet and Burned Cables.

Careful organization and perfect co-operation with the forces of the telephone company, and the location of Western Electric distributing houses at business centers, made these records possible.

The Forest Products Exhibition

At the Forest Products' Exposition held at the Coliseum, Chicago, April 30 to May 9 inclusive, the Northern White Cedar Association had a remarkable exhibit. The exhibition was for the purpose of demonstrating to engineers, architects, dealers and consumers the many advantages of northern white cedar. The space occupied by the association was decorated in a pleasing and appropriate manner. At the rear of the space was a stockade built with cedar poles of seven, eight and ten-foot lengths, with five-inch tops, and three sides of the space were inclosed by a cedar fence built of six-inch halves of seven and eight-foot lengths surmounted by a railing constructed of seven-inch quarters, the latter being the smallest sizes of posts manufactured.

An interesting feature of the exhibition was a pole line constructed by workmen of the Chicago Telephone Company, employing four six-inch by 25-foot poles in each corner of the exhibit space and one seven-inch 35-foot pole in the center. Particular attention was directed to the taper of these poles.

There were also two other attractions which caused considerable comment. One of these showed two standard railroad ties which were in use by the Chicago & North-Western Railway for twenty-nine years, cuts in the wood showing the material was not impaired in quality after so many years of usage. The other was a pole cut into sections which was installed fifty years ago by the Western Union Telegraph Company in connection with a telegraph line between Green Bay, Wis., and Escanaba, Mich. The wood was found to be in excellent condition about one inch from the surface.

Brevities of the Business

The Activities of the Whole Telephone Field Told in Short Paragraphs

PERSONAL NOTES.

A. J. Carter, general sales manager—that is the way this Kellogg man signs himself now—and hundreds of friends in the telephone world will congratulate that gentleman and, with pride, point to him as one "who does things." As "Nick" Carter, the telephone world knows him well and appreciates his worth. Mr. Carter was ambitious from the first, as will be noted from the fact that he selected the natal day of the father of our country upon which to be born and honored George, Iowa, with his advent on February 22, 1882. In 1905 he married Miss Blanche Percival, of Ida Grove, Iowa and their happiness has been greatly enhanced by the arrival, some seven months ago, of a daughter. Back in 1898 Mr. Carter was lineman in George, Ia., did splendid service when Eagle Grove built its plant and helped build the toll line from Webster City, to Ft. Dodge. In 1900 he was installing plants for the Globe Automatic Company out in Iowa and Nebraska and when not thus engaged, was blazing trails in virgin territory and doing the sort of missionary work which counts. He has held many responsible positions with various independent operating companies and been a constant student in the ever broadening work. Not the least worthy was the rebuilding of the telephone and electric light plant at Devils Lake, N. D. Here he gained first hand knowledge of the force of gravity through a 30-foot fall from a telephone pole, which broke his arm. And from that time on decided not to use climbers. After the latter experience he was located at Sheldon and Sibley, Iowa and finally connected with the Ida Grove Telephone Company, and rebuilt the Corydon, Ia. plant. Thence to the Wayne County Telephone Company, Seymour, Ia., where he assumed charge until his best interests demanded that he go to Chicago to look after and market a special test set of his invention. This brought Mr. Carter in touch with the Monarch Company which for eight years claimed him for its own and he exploited Monarch products during that period, in Iowa, Nebraska and South Dakota. In 1912 he enlisted with the selling force of the Kellogg Switchboard & Supply Company as sales engineer with headquarters at Sioux City, Ia. One reads earnestness, stick-to-itiveness and thoroughness in his quiet speech and manner and reading thus it is no surprise that Mr. Carter has reached a top rung of the ladder from whence he can direct his co-workers and reach down a helping hand when occasion warrants.

Benjamin S. Read, general manager of the Missouri and Kansas Telephone Company, with headquarters at Kansas City, took office April 30, in St. Louis as second vice-president of the Southwestern Bell Telephone System, operating in Missouri, Arkansas, Kansas, Texas and part of Illinois.

H. O. Davidson, manager of the Lincoln Telephone & Telegraph Company in Seward, Neb., has been transferred to Ashland. L. B. Maple succeeds him.

Percy Redmund, general traffic superintendent of the Pioneer Telephone & Telegraph Company, at Oklahoma City, Okla., has accepted the same position with the Southwestern Telephone & Telegraph Company in Texas.

E. P. Whitney, assistant engineer of the New England Telephone & Telegraph Company, Boston, Mass., died at that city April 28. Mr. Whitney was forty-four years old and a member of the Telephone Pioneers of America.

John L. Schnitzer, local manager of the Bell Telephone Company at Hannibal, Mo., has resigned.

At a recent meeting of the Chicago Telephone Company directors, Marvin Hughitt was elected a director to succeed the late Byron L. Smith.

Lester L. Brown has been appointed secretary of the Bloomfield Mutual Telephone Company, at Bloomfield, Montana.

Edward R. Harris, assistant auditor of the Home Telephone Company, died in Kansas City, Mo., on April 19. Though a product of Newcastle, Ind., Mr. Harris came to Kansas City 30 years ago, and spent most of his business career with the Home Telephone Company.

Victor L. Crawford, known to every Jovian as "Happy Crawford," because of his smile which won't come off, has enlisted under a new banner. Hereafter he will be found bearing the slogans "The hardware makes the line, Hubbard makes the Hardware" and "There's a Peirce bracket for every purpose" into every corner of the country. "Happy" during his nine years traveling for W. N. Matthews & Brother has been loyal booster for everything electrical, and his smile and ready wit have been welcome features at Jovian gatherings everywhere. Hubbard & Company is to be congratulated on his addition to its forces.

C. C. Huffman, a new member of the Kellogg sales force, will represent that company in its relations with many customers in the state of Iowa. He is no novice in the tangled web of telephony, having had ten years' experience. Much of his activity has been confined to alien soil where, under the flag of Great Britain, he did line work for the Bell Company in Montreal for two years and put in another two years in installation work. He was construction engineer for the Huron Telephone Company of Canada, later Canadian representative of the Monarch Telephone Company and finally took shelter under the Stars and Stripes as a Western Electric Company salesman. Mr. Huffman has many good ideas and one of his best is that a salesman should be able to do anything for a customer. He cites an instance where a telephone manager wanted a layout for a new exchange. Instead of sending in an S. O. S. call to headquarters, he took off his coat and vest, folded them carefully and hid them, so that he would be sure to "feel them when he went out," girded up his loins and stuck to the job for four days. When he left he had eight callouses, a sprained wrist and a twelve-hundred-dollar order.

J. C. Weirick, formerly chief clerk for the Bell Telephone Company at Harrisburg, Pa., goes to Philadelphia May 11 as assistant general commercial engineer for the company.

At a meeting of the board of directors of the Chicago Telephone Company, following the annual meeting of stockholders, which occurred a few weeks ago, the retiring officers of the company were re-elected for the ensuing year.

After eighteen years service as manager and later as cashier of the Southern Bell Telephone Company in Charlotte, N. C., E. H. Wilson tendered his resignation and will be succeeded by W. L. Crout of Newberry, S. C.

P. H. Hopkins has been appointed acting general manager of the Missouri-Kansas Telephone Company, in Kansas City, succeeding Ben. S. Read.

H. B. Whatley, formerly of Austin, has been appointed traffic chief of the San Antonio district of the Southwestern Telegraph and Telephone Company. Mr. Whatley served in the same capacity in Austin.

William T. Westbrook, a pioneer telephone man, and an officer of the Delaware & Atlantic Telephone & Telegraph Company, died at his home in Philadelphia, April 22, at the age of seventy-five years.

NEWS FROM THE FIELD.

CALIFORNIA.

The Pacific Telephone and Telegraph Company is finishing up the improvement work in the city of Fresno which was started last December. A 600-pair cable is now being connected with the central exchange. Several thousand dollars have been spent in improvements.

The Morgan Hill Telephone Company, the branch office of the Pacific Telephone & Telegraph Company, has moved to new quarters between Encina and Hatzfelt avenues, on Monterey street. A new switchboard and other conveniences have been installed.

A telephone central will be established in the store of B. A. Chase in Adin, the first of June.

The Pacific Telephone & Telegraph Company have a force of 18 men at San Jose improving the system. A cable will replace the aerial wires along Franklin street and a large number of the old poles along Franklin street are being removed and replaced by combination poles, which will be used by the town, telephone and electric railroad companies.

CONNECTICUT

The Southern New England Telephone Co. has taken a five-year lease of the upper floor of the Thompson block in New Haven, which they will fit up as a local exchange.

FLORIDA.

The Home Telephone Company of Jacksonville at its recent annual stockholders' meeting elected the following directors: Charles Blum, J. C. Halsema, John G. McGiffin, A. M. Ives, John W. Dodge, Harry J. Wood, J. J. Ahern, L. G. Hirth, J. W. Ingram, Neal Finkelstein, A. S. Metzner, Edmund Land and C. L. Fisher. Officers chosen were as follows: Charles Blum, president; J. J. Ahern and A. M. Ives, vice-presidents; John G. McGiffin, chairman of the executive committee; Harry J. Wood, secretary and John W. Dodge, treasurer.

GEORGIA.

The Atlanta Telephone & Telegraph Company will spend $100,000 in telephone improvements in Atlanta in the near future.

IDAHO.

An ordinance granting a franchise to the Lone Star Telephone Company at Nampa was passed by the city council recently. The ordinance gives the company the privilege of constructing lines on any or all of the streets of the city and of maintaining and operating an exchange.

Under the direction of J. M. McGee, manager of Nez Perce Co-operative Telephone Company, $3,000 in improvements of the line is being expended.

ILLINOIS.

The district office headquarters of the Chicago Telephone Company at Joliet were moved from the Telephone building in Clinton street to the second floor of the Monroe office building, opposite the postoffice. The new office is reached by a stairway on the Clinton street side of the building.

McConnell Telephone Exchange Company, McConnell Stephenson county; capital, $1,000; business of telephone exchange; incorporators, William Lawler, John F. Rackow, Jacob W. Stamm.

A fifty-year franchise was given the North Harwood Telephone Company at the meeting of the new village board recently. The board is composed of the following members: President—John New; trustees—Robert Shinker, L. N. Bear, Charles Walker, T. G. DeWitt, N. L. Funk and William New; clerk—Orlo Sheehan.

Prophetstown Mutual Telephone Company, Prophetstown; capital stock increased from $10,000 to $12,500.

The annual stockholders' meeting of the Citizen's Mutual Telephone Company of Cambridge was held recently. J. D. Stiers, G. G. Johnson and A. F. Johnson were reelected directors by acclamation.

Franklin Orton, of Lincoln, assumed control of the telephone exchange at Macon the first of May, following a deal recently consummated.

The Chicago Telephone Company moved to its new quarters in the W. H. Jones building at the corner of Main street and Center avenue, Plano. The building has been entirely remodeled, the main part consisting of a public office in the front, an operating room and at the rear a large room for the plant department.

A petition was filed with the Grafton City Council April 28, asking permission to sell the Calhoun Telephone Company in Grafton to Paul Carpenter. The permit was granted and it is presumed Mr. Carpenter will take charge of the property soon.

The Citizens' Telephone Company has purchased the lot between the Kraeger and McDonnell buildings in Pekin and will erect an office structure and install a telephone exchange.

The storm of May 10 did considerable damage to the wires of the Central Union Telegraph Company, at Rock Island. Four hundred telephones were out of commission and many cables were burned out.

The telephone exchange of the Citizens' Telephone Company and the Bell Telephone Company, at Manito, was destroyed by fire May 10.

A deal was closed May 12 between the Alpha Mutual Telephone exchange and the Cox Telephone exchange, whereby the former company acquired all the telephone equipment and business of the Cox exchange, the deal dating back to May 1.

Work at McHenry's new telephone exchange is being rushed with all possible haste.

The Colfax telephone exchange has been sold and it is said the Utilities Commission has allowed a raise in the rates to the new proprietor, Edward Entwistle, of Chatsworth.

INDIANA.

The annual election of directors of the New Paris Home Telephone Company took place May 6 and the following reelected: S. C. Richie, president; L. D. Lesh, Eaton, O., secretary-treasurer; Elam Fisher, C. B. Cokefair F. W. Mitchell, Eaton, O., and Samuel Grubbs, Greenville and W. H. Hageman, New Madison, directors.

O. A. Krinbill, manager of the Chicago Telephone Company in Hammond, announces that the contract for a $12,000 exchange building on the Ridge road at Highland will be let May 1 and work started at once. Within sixty days after actual construction is commenced it is planned to occupy the structure.

The Lafayette Telephone Company will file a petition with the public service commission of Indiana for permission to double its capital stock, making it $300,000. The company proposes to use $80,000 taking up preferred stock and the remainder in making physical improvements.

IOWA.

The Story County Telephone Company of Maxwell, has bought the building known as the Graves building and will use it to store supplies. It is being moved to the rear of the lot and the company expects to build a one-story brick building in which to install the exchange.

The telephone company of Galva have decided to remove the wires from the poles in the street, and are digging the ditches to lay the cables under ground.

The Bell Telephone Company has a large force of men at work in Hamburg. The Bell will take over the Independent system or consolidate them so patrons can avoid the necessity of maintaining two.

The Iowa Telephone Company sustained a loss of $3,100 in a very recent storm. The company still has a large force of men repairing the damage.

KANSAS.

A new section of switchboard is being installed in the telephone exchange of the Missouri & Kansas Telephone Company at Second and Walnut streets, Hutchinson.

The new Roxbury Telephone Company is figuring on putting in a new central office at Roxbury.

KENTUCKY.

The Elk Fork Telephone Company, Elk Fork; capital $340; incorporators, H. F. Fannin, Walter Skaggs, J. F. Skaggs and A. T. Wingo.

A fire in Sebree, May 11, damaged the Cumberland Telephone Company to the extent of $500.

MICHIGAN.

$25,000 has been authorized by the Michigan State Telephone Company for the purpose of increasing the long distance facilities connecting Battle Creek, Albion, Marshall and Detroit.

A new long distance switchboard, installed at a cost of $16,000 is now in service in the Kalamazoo office of the Michigan State Telephone Company.

The first state convention of the Independent Telephone Association of Michigan, will be held June 2.

A union farm telephone line passing the farm homes of Albert DeFreeze and Charles Brown has been bought by them and will be connected with line 3 which will enable them to reach Morrice.

The Citizens' Telephone Company is busy putting in a telephone line from Montague to Fruitvale.

Work has been started on the new telephone line in Weadock.

H. A. Lanning was re-elected president of the Drenthe Independent Telephone Company at Holland. Other officers are: B. Ter Haar, sr., vice-president; Dr. A. J. Brouwer, secretary-treasurer and manager; D. Hunderman and H. Doezema, directors.

MINNESOTA.

The Northwestern Telephone Exchange Company will construct an exchange building at 1111 West Twenty-second street, Minneapolis to cost $32,000. It is to be a two-story brick and tile building, with reinforced concrete floors.

The board granted the Alborn Telephone Company authority to use the county highways in the Alborn district for right-of-way purposes, providing its poles were placed along the roads within ninety days.

The Clover Telephone Company at Bagley recently completed arrangements with the Garden Valley Telephone Company, whereby connections can be made with their lines at Clearbrook and Gonvick.

MISSISSIPPI.

According to the authorized statement of J. C. Hay, special agent of the Cumberland Telephone Company, representing general manager C. A. Stair of New Orleans, Vicksburg will have a modern structure erected the first of the year on the company's present exchange location.

MISSOURI.

The Linneus and Rural Telephone Company was recently sold to I. N. Bundren, of New Cambria.

At the stockholders' meeting of the Cecil Farmers' Telephone Company at Elkton, R. K. Rawlings was re-elected president and J. C. Hopkins secretary and treasurer.

Henry H. Glascock of near Mt. Zion in Marion county, who recently purchased the New London telephone exchange from S. K. Caldwell, took possession May 15.

The A. T. Adams telephone plant in Tipton was purchased May 16 by what is known as the Citizens' Telephone Company for $9,400. The officers are: S. W. Hurst, president; P. W. Henry, secretary; Joseph Schwickrath, treasurer.

MONTANA.

The Miles City and Ekalaka Telephone Company held its annual meeting and elected officers as follows: President, George M. Miles; vice-president, E. B. Holt; secretary-treasurer, H. F. Lee; directors: J. H. Price, Dan Bowman, Kenneth McLean, F. D. O'Neill.

Articles of incorporation were filed with the county clerk for the Wilsall Mutual Telephone Company, which has taken over the old Bell system throughout the Shields valley. The capital stock is $10,000 divided into 40 shares. The directors are E. T. Gruwell, George M. Parker, E. G. Blair, J. M. Jones, H. W. Knox, Thomas Allphin and S. S. Working. The lines will run from Clyde Park to Ringling.

NEBRASKA.

The Lincoln Telephone & Telegraph Company was granted permission by the railway commission to decrease toll rates between Pleasant Dale and Milford from fifteen to ten cents. The Cambridge-Holbrook Telephone Company was granted permission to increase its exchange rate from 75 cents to $1. The Pierce Telephone Company was authorized to increase its switching rate from $2.50 a year to $3 a year.

The state railway commission has placed its O. K on a stock issue of $800 by the Tuckerville Telephone Company, a new concern in Custer county, for the purpose of buying and improving twenty-five miles of farm lines with sixteen instruments connected.

The exchanges of the Nebraska Telephone Company at Genoa, Newman Grove and Albion, have been sold to the Monroe Telephone Company.

NEW JERSEY.

Engineers of the New York Telephone Company have installed in its local building on Washington street, Newark, a new switchboard of a semi-automatic type. It is hoped to utilize the apparatus coincident with the opening of the new Mulberry exchange, which probably will be put in operation early in June.

NEW YORK.

The addition being built at the east side of the New York Telephone Company's building in Barrett street, Schenectady, is rapidly nearing completion, the outside walls being completed to the full height and some of the interior work finished.

Announcement is made by Frank H. Bethel, vice-president of the New York Telephone Company, of the award of the general contract for the construction of the company's building at State and Park streets, Albany, to the Feeney & Sheehan Construction company of this city. The amount is said to be $450,000.

NORTH DAKOTA.

The materials for the new line to be constructed by the Sheyenne Rural Telephone Co., have been ordered and work on the erection of poles and wires will begin as soon as they arrive.

The Farmers' Telephone Company met at Belfour and elected officers as follows: President, W. E. Barbie; vice-president, L. L. Jewell; treasurer, A. L. Lombard; secretary, J. W. Gates.

The Blaisdell Farmer's Telephone Company, Blaisdell, Mountrail county, capital stock, $5,000; incorporators John Evensvold, Lewis Anderson and J. S. Brye, all of Blaisdell. Filed April 23.

The Northern Telephone Company is remodeling the exchange at Bisbee. Preparations are also being made to extend the rural service, the line to the northeast being under consideration. The extension is expected to cover the entire territory to the east and north not now in touch.

The North Dakota Independent Telephone Company is installing a booth in the Northern Pacific depot at Valley City, for the convenience of its patrons, both the traveling public and local people.

A meeting of farmers was held May 16 to plan for the forming of a company to erect a telephone line to run from Minot northwest, probably along the Meridian road, at least as far as Kellogg. A number of farmers are interested in the project and the prospects for the line seem good.

OHIO.

The state utilities commission on April 23 approved the application of the Cincinnati & Suburban Bell Telephone Company for authority to issue at par $637,150 common capital stock. The money is to be used for the purpose of completing the new central exchange building and purchasing equipment for same.

Stockholders of the United States Telephone Company, Columbus, the independent long-distance organization, have re-elected the following directors for another year: F. H. McKnight, C. A. Otis, F. A. Davis, D. J. Cable, G. R. Johnston, F. L. Beam, H. M. Daugherty, E. R. Sharp, F. R. Huntington, W. L. Cary, F. W. Stevens and W. F. Burdell.

Improvements, extensions and betterments that will cost $1,700,000 are to be made in the property of the Cleveland Telephone Company, starting immediately, if the Utilities Commission authorizes the issue of $4,000,000 of two-year 6 per cent notes, for which the company on April 30 made its application and arguments.

Work is progressing rapidly on the Cleveland Telephone Company's new Doan Exchange building on E. 105th Street, near Euclid.

The Cincinnati & Suburban Bell Telephone Company offers to stockholders of record June 15 the right of subscription to 12,743 shares of stock, par $50, at par, in the ratio of one share of new stock for each twelve shares held. The stock is to be paid for in full on or before July 2. Transfer books will be closed from June 16 to July 1.

The Akron People's Telephone Company has petitioned the public utilities commission for privilege to issue $750,000 7 per cent cumulative preferred capital stock.

The Cleveland Telephone Company has been authorized by the public utilities commission to issue $4,000,000 5 per cent 2-year notes. The issue will be used to refund present obligations and to make betterments.

OREGON.

The eleven-story Pacific Telephone & Telegraph Company building located on the southeast corner of Park & Oak streets, Portland, is now practically completed and will be formally opened about the first of June.

PENNSYLVANIA.

The Northern Pennsylvania Telephone society held its annual meeting May 15 in Wilkes-Barre. Directors were elected, among whom were E. G. Simmons, district manager, Scranton, and Frank M. Stanton, assistant district traffic superintendent. E. G. Simons was elected president; W. A. Hughes, vice-president, and F. M. Stanton, secretary-treasurer.

SOUTH CAROLINA.

Turbeville Telephone Company of Clarendon county was commissioned, with a proposed capital of $1,500. The petitioners are D. E. Turbeville, M. J. Morris and D. L. Green.

The railroad commission has approved the proposed change in the present telephone system in Orangeburg. It now has a magneto system and the new system to be installed will be the

common battery system. The telephone wires on the main business street will be placed underground. The work of placing this new system in Orangeburg will require about 18 months' work.

SOUTH DAKOTA.

At a bankrupt auction sale the property of the Centerville Telephone Exchange Company was purchased by Marvid Carlson of Beresford for $16,700. It is said that other men were associated with him in the purchase.

The Farm and Home Telephone Company of Wagner, was damaged by fire May 5 to the extent of $2,500. Work of rebuilding same is progressing rapidly.

The people of Burbank have petitioned the state railway commission to require the railway company to install a telephone service in their depot at that place.

The Wakonda Telephone Company will move its office to the new rooms over the bank of Wakonda, and is also laying a cable in the alley back of the buildings, and in a few weeks all lines will be taken off Main street.

TENNESSEE.

The Sun Telephone & Telegraph Company is making permanent improvements in Selmer by putting in cables, removing all wires, which will greatly improve the service on all lines.

At a meeting of the board of mayor and aldermen February 17 an order was issued and the recorder directed to notify the Cumberland Telephone & Telegraph Company at its offices in Union City and Nashville in writing to remove the telephone poles from the streets of the business section of the city and place the wires underground. This order is effective in thirty days.

Citizens of the Christmasville community have organized a new independent telephone company at that place with about 100 subscribers already listed and others are expected to take stock soon. A new switchboard and outfit has been installed by Mr. Lewis, chief operator of the Trezevant Telephone Company. This company will connect with all other independent companies in this and adjoining counties.

Within a short time trains on the C., N. O. & T. P. railroad between Chattanooga and Cincinnati will be operated by telephone instead of by telegraph.

TEXAS.

The Southwestern Telegraph and Telephone Company is about to complete its extensive improvements in Bay City, consisting of the installation of an entire new plant, cables and switchboard.

The Northeast Texas Telephone Company is spending $2,000 in betterments on its plant at Sulphur Springs.

The Star Telephone Company at Rio Grande City announces direct connection with the Rankin Telephone Company at Samfordyce to Mission, and there connecting with the Southwestern Telegraph and Telephone Company for all long distance connections and the Western Union Telegraph Company.

The Southwestern Telegraph and Telephone Company at Plainview has cut over from magneto to the common battery system. The equipment inside and outside is of the very latest, new switchboard, new poles and cables having been installed. The new offices occupy the entire second floor of the O'Keefe building.

The rural telephone has just installed a new switchboard and office terminal, which will be of great assistance to the telephone traffic at Salado.

The Citizens' Telephone Company at Stockdale, is erecting an addition to the central office preparatory to the installation of a large double switchboard.

A new telephone line is being built connecting Zionsville and Brenham, under the name of the Harrisburg-Brenham line. The parties interested are G. W. Grater, Herman Basjeske, Fritz Kramer, E. A. Klingsporn, Henry Stegman, W. C. Hohlt, Gus Jeske, Fritz Zeiss and Herman Meuer, Jr.

Another rural line is in course of construction from Greenville via Mill Creek Switch to Brenham, and there are twenty-two subscribers to this new convenience.

Cora Telephone Company, Alva; capital, $8,000; incorporators: George W. Clapp, B. C. Smithson, both of Whitehorse; Walter G. Howell and Dudley McMurphy, Alva.

John W. Gee, the largest stockholder in the Crawford Telephone & Telegraph Company, has disposed of his holdings to Messrs. W. T. Miller and Ed Sadler of Crawford, who will have the active management of same in charge for the future.

Parita Telephone Company, Parita, Bexar County; capital stock, $2,500. Incorporators: J. A. Pirie, Roy Barnburg, Joe Campbell.

The citizens of the city of Magnolia Park will have a complete telephone system at an early date. Plans are now being worked out.

The Streetman Telephone Company of Streetman, Freestone county, with $5,000 capital. Incorporators: C. A. Elliott, R. M. Thomson and S. G. Ward.

The Southwestern Telephone Company is rebuilding its entire plant at Plainview, which means an expenditure of more than $50,000.

The Southwestern Telephone Company has a large force of workmen at Cuero removing the telephone poles from the main business streets.

The Albert Bailey Telephone exchange at Menard, Menard county, has been sold to the Southwestern Telegraph & Telephone Company.

UTAH.

The local manager of the Mountain States Telephone and Telegraph Company has assured the city board of commissioners that the company will remove all poles from many of the streets of Ogden before July 1.

WASHINGTON.

Stockholders of the Rural Telephone Company at Waitsburg elected these officers: President, M. H. Lund; vice-president, W. D. Wallace; secretary-treasurer, Harvey Price; directors, Frank Keiser, Fred Bachman, Emory McCoron, Harvey Price and M. H. Land.

WEST VIRGINIA.

The entire top floor of the Schmulbach building, Wheeling, has been fitted up for the use of the National Telephone Company.

A large force of men are employed in repairing the lines and cables of the National Telephone Company throughout Mandeville. Many old wires are being replaced with new ones, and the cables are being tested.

The Old Telephone Company, of Odd, to operate a telephone line; capital stock, $5,000. Incorporators: H. H. Lilly, S. B. Hale, A. E. Fink, C. H. Hedrick and C. E. Wallace of Odd.

WISCONSIN.

A resolution giving the Wisconsin Telephone Company permission to lay conduits in a number of city streets in Superior, was given formal passage at the meeting April 23. The resolution provides that the city shall have the right to lay a duct in the same trench used by the telephone company.

The directors of the Lindsey Telephone Company of Lincoln, held a meeting and decided to purchase a switchboard and rebuild lines.

About 200 telephones of the Wisconsin Telephone Company were out of commission at Neenah, due to a break in a cable under the Fox river.

The Troy and Honey Creek Telephone Company, operating in the western part of Dane county, was given authority by the state railroad commission to make a readjustment of its rates.

The Boyceville Telephone Company of Boyceville is being incorporated with a capital of $10,000 and will take over the lines of the Knapp Telephone Company. The incorporators are Dr. W. H. Park of Glenwood City and O. E. Skamser, V. B. Lewis, C. W. Hayes and William Schlough of Boyceville.

The following officers were elected at the quarterly meeting of the Wisconsin Telephone Company, held recently at Milwaukee: President, B. E. Sunny; first vice-president and treasurer, Alonzo Burt; second vice-president, H. F. Hill; secretary, W. I. Mizner; assistant secretary, F. L. Curtis; general auditor, B. S. Garvey.

The Wisconsin Telephone Company's present plans to expend $16,000 on De Pere's telephone plant involve not only the removal of many poles and duplicate lines formerly operated by the Fox River Valley Telephone Company but also an increase in underground and overhead facilities to care for future growth. The work has already been started and is expected to be completed by August.

The new building to be erected for the Wisconsin Telephone Company at 422-24 Broadway, Milwaukee, will be a five-story, steel frame, fireproof structure with basement.

The railway commission authorized the Wild Rose Telephone Company to issue two allotments of capital stock, both for extension and improvements. The first is $850; the other $3,150, also authorized the Pilsen Telephone Company in Kewanee county to issue $175 in stock for extension of its rural lines in the vicinity of Luxemburg.